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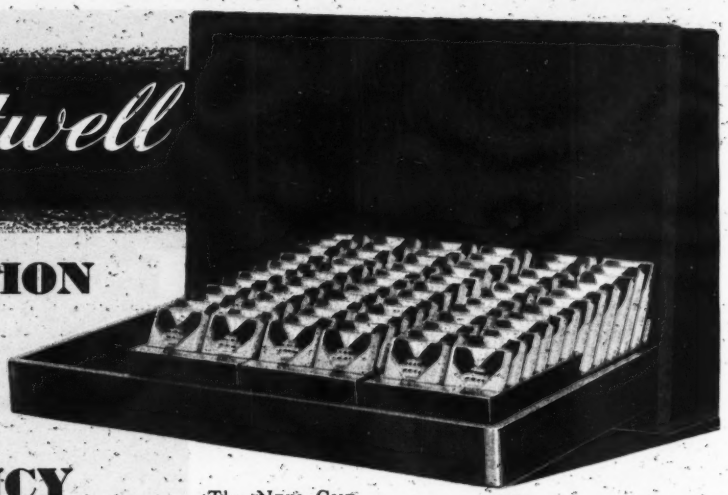
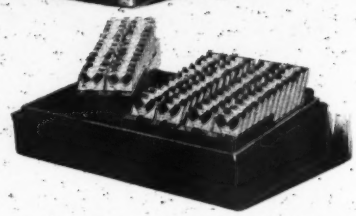
The New Cutwell BUR

NEW PERFECTION in STEEL and DESIGN . . PLUS . . NEW EFFICIENCY in PACKAGING



Just as the cutting efficiency and serviceability of the burs themselves will reveal to you a new standard of bur performance, so will the complete protection and easy visibility afforded by the NEW CUTWELL packaging system prove the most satisfying and practical answer to your demand for bur *economy*.

For here, at last, is virtual insurance against loss through waste and spoilage.



The NEW CUTWELL 3-Gross Assortment case consists of a bakelite tray, with cover which also serves as a base. Space in tray for extra 1-gross assortment or surplus packages.

Individual packages or entire 1-gross blocks can be lifted out as needed.

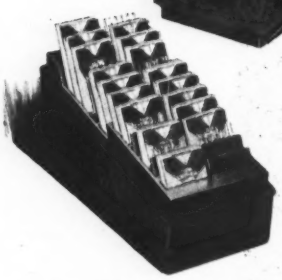
All NEW CUTWELL burs are supplied in the new cellophane-wrapped window-package, whether ordered by the dozen or in case assortments. The burs are visible, yet remain fully protected until needed. Each half-dozen is contained in a little bakelite block, which can be used as an individual holder.

NEW CUTWELL 3-Gross Assortment

Three different 1-gross assortments of packaged burs in individual bakelite bases—each equally divided as to Straight and Angle Handpiece types—as follows:

Assortment "B"—12 dozen plain round
Assortment "C"—12 dozen plain inverted cone
Assortment "D"—12 dozen crosscut fissure

Complete in Bakelite Case **$30.00**



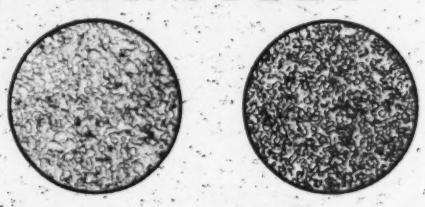
The NEW CUTWELL 1-Gross Assortment case serves for any selection, whether you use both Straight and Angle Handpiece types, or Angles only. You work from a few open packages, leaving the rest of stock protected, though visible.

Assortment 'A'

A comprehensive assortment comprising 8 dozen plain rounds and inverted cones and 4 dozen crosscut fissures—half Handpiece, half Right Angle.

Complete in Bakelite Case **$11.25**

NEW DENSITY OF STEEL



ORDINARY BUR STEEL — NEW CUTWELL STEEL

(Magnified 500 diameters)

NEW CUTWELL bur steel has greater density because it is *electro-wrought and annealed*. This greater density makes possible more accurately machined blades—blades with keener, stronger cutting edges, smoother surfaces, and a more uniform hardness of temper. And because this perfection of manufacture brings out more fully the efficiency inherent in its advanced design, the NEW CUTWELL assures a quality of bur performance that, coupled with the waste-reducing advantages of NEW CUTWELL packaging, makes it

the most economical bur you can buy!

The Ransom & Randolph Co.

Toledo, Ohio

The DENTAL DIGEST

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AN AUTOMATIC INVESTING MACHINE

DAVID W. PHILLIPS, D.D.S.
Chicago

WHILE it must be admitted that dentistry will probably always consist essentially of fine hand work, the statement can nevertheless be made that the profession has not fully availed itself of many of the advantages of the machine age. The ability of a machine to do things more cheaply and more quickly is generally considered of prime advantage, but in addition to such advantages, dentistry is interested much more in the ability of a machine to do things consistently better and with improved end-results when used by the average dentist or assistant.

Now that casting to dimensions is an accomplished fact, and the present precise end-results of the expert cannot be improved, attention should certainly be directed to the simplification of this precision process to the point where any dentist or assistant can obtain consistently perfect results.

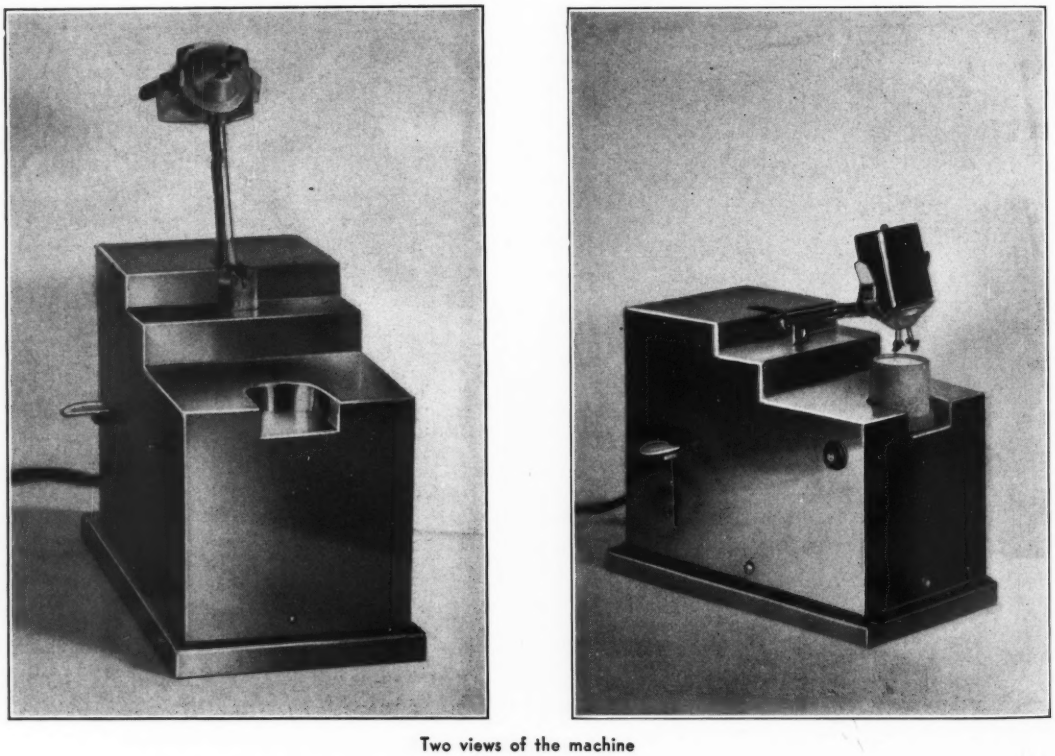
A simple process might be defined as one with which a novice with little training could accomplish the same results as the expert. The technique of the new automatic investing machine accomplishes all this and will produce results at least equal to the most difficult and exacting precision hand techniques in vogue today.

To simplify the process further, a single heavy mix of investment is used. Obviously, this is easier to prepare than the double mix of two different consistencies, a thin and a heavy, the latter generally being of a vague, "try and guess it" consistency.

It is conceded that the best castings are made from patterns invested with a mix that is too heavy to paint about the pattern. Smoother castings and greater setting and thermal expansion of investment result from this heavy mix. But the perfect distribution by hand of this type of mix over every tiny crevice and corner of the pattern is accomplished by too small a proportion of those making inlays today. The best of present techniques demand infinitely more skill and care than is employed in the making of the average inlay. With the automatic investing machine the production of smooth precision castings need not be confined to the more expert minority, but any dentist or his assistant can accomplish such results more easily and quickly, and far more consistently than by present methods.

With these thoughts in mind, experiments were conducted for distributing the thick mix over the pattern with a machine. It was soon discovered that the techniques in vogue would not lend themselves to such mechanical procedure. This is no doubt the reason that an automatic investing machine has not been developed in the past. As a result of the experiments, a new technique was evolved which is simple, quick, scientifically correct, and easily carried out.

Briefly, all that is required is to place in the automatic investing ma-



Two views of the machine

chine a clean, dry pattern and a lined ring, closed at one end and filled with a heavy mix of bubble-free investment. The switch is turned on and the machine does the rest, even to placing the crucible former on the ring and automatically turning off the current when its work is finished.

Essential Features

1. A pattern is mounted on a crucible former, the pattern and former being inverted.
2. With the pattern under continuous fine vibration, it is embedded into the ring filled with a single, thick mix of investment. This is done slowly the first time to distribute the investment thoroughly over the entire surface of the pattern.
3. The pattern is removed by raising it with its adhering investment, and it is maintained under constant vibration while up and out of the investment to dissipate any bubbles in the adhering investment.
4. The embedding and removal process is repeated.
5. With the pattern wet with bubble-free investment it is finally reembedded entirely and the sprue former is brought down fully on the ring, after which vibration is discontinued.

This whole procedure is completed by the machine.

Advantages of Technique

1. An important element in the technique is the removal of the pattern from the mix and vibration of the pattern when up and out of the mix to distribute and free the adhering investment of bubbles. Mere vibration of the pattern down into the mix will not produce good, smooth castings. The automatic investing machine carries out all of these movements exactly, not only as to the time and speed of each movement but also as to the proper depth and height.
2. The machine maintains the proper central relationship between the moving crucible former with its pattern or patterns and the ring so exactly that two, three, or four patterns can be invested as easily as one without any danger of their striking the edge of the ring as the patterns are embedded.
3. The pattern sinks into a putty-like mix almost as if it were water when under vibration as employed by the vibrating head of the machine.
4. A rubber dam drum-cap is used as a bottom for the ring. It is completely water-tight, permitting the use of the water bath if desired, and its elasticity permits full longitudinal expansion of the investment. It slips

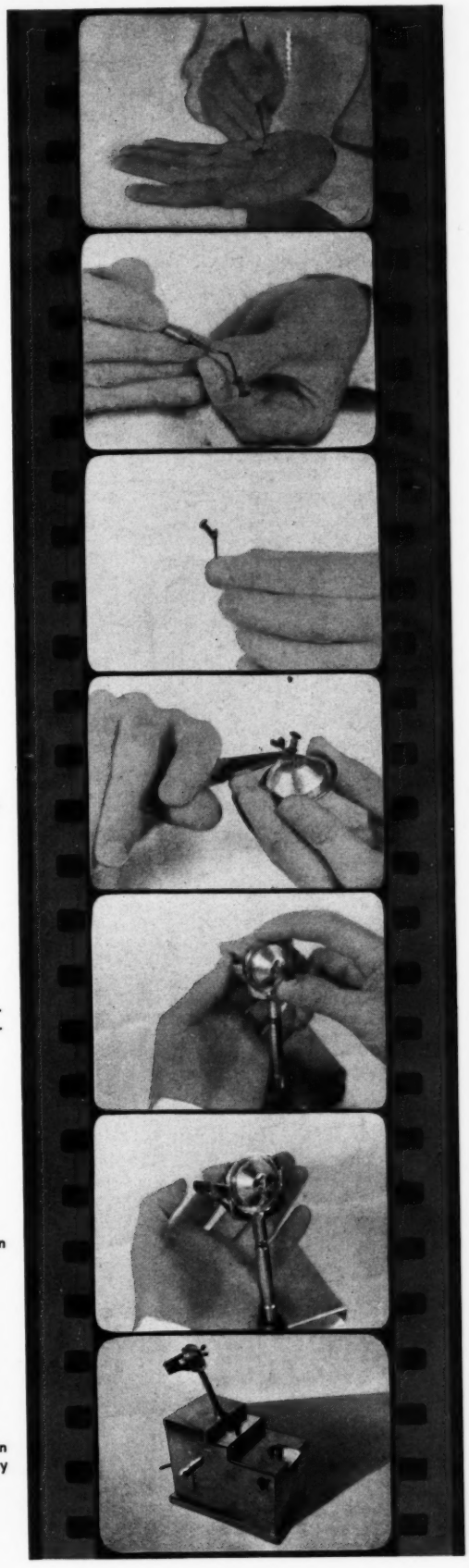


Fig. 1—Adding a small wax bead at the marginal ridge into which the sprue is placed.

Fig. 2—Adding wax for correct contact point.

Fig. 3—A sprued M. O. D. pattern.

Fig. 4—Placing sprued patterns into crucible former.

Fig. 5—Placing crucible former into vibrating head of machine.

Fig. 6—Crucible former in position.

Fig. 7—Investment arm in back position, out of the way and ready for investment.

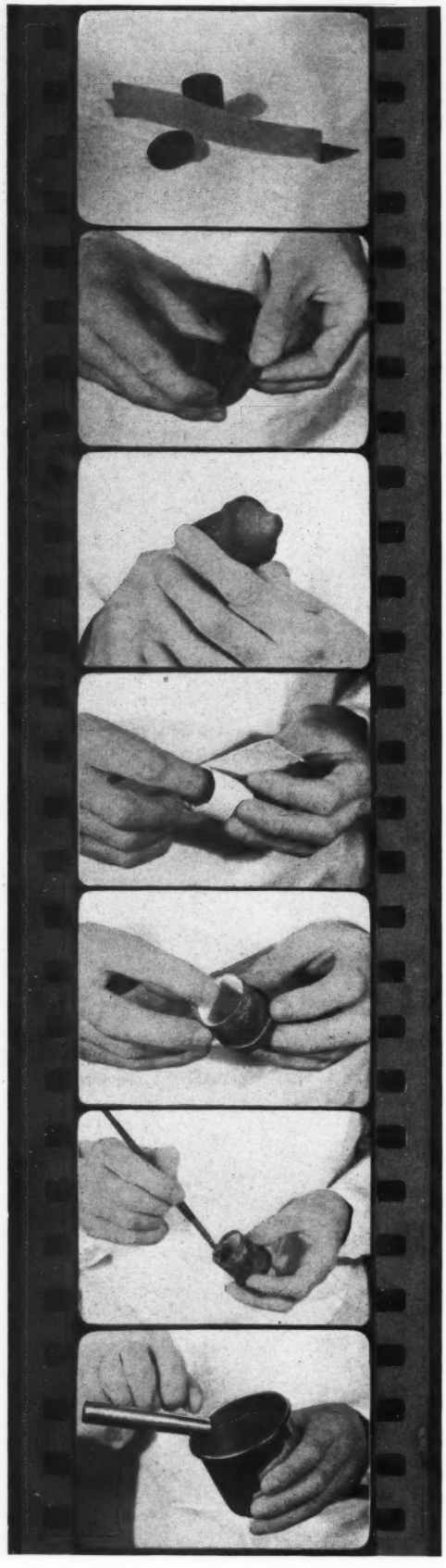


Fig. 8—Rubber end-cap, asbestos lining, and ring. Note that the width of the lining is about three sixteenths of an inch less than the height of the ring.

Fig. 9—Rubber cap being snapped into position on end of ring.

Fig. 10—Rubber cap in place. Note how securely it fits and resists displacement.

Fig. 11—Coiling the lining before insertion into the ring.

Fig. 12—Lining in place.

Fig. 13—Moistening the adapted lining.

Fig. 14—Tubular water-measuring device. Its small circumference prevents "piling up" of excess water over the top.

on and off easily, and is a secure bottom for the ring when filled with investment.

5. A strip of asbestos long enough to coil twice within the ring is used. It is moistened with a brush after placement. This coil has some advantages over the single liner previously employed, providing not only greater insulation and less resistance to investment expansion but also permitting the entire mass of investment to be pushed out of the ring. This strip is about three sixteenths of an inch narrower than the ring height so that when coiled within, it does not reach to the top of the ring.

Advantages of Asbestos Coil Liner

1. Full radial setting expansion is permitted.

2. Full radial thermal expansion of investment is permitted, which is especially valuable with the newer super-expanding investments where this exceeds the expansive ability of the metallic ring.

3. Explosions of the investment when placed in a hot oven for quick elimination are prevented. The insulating properties slow down heat penetration that is too rapid.

4. Heat is retained much longer in the mold while the gold is being heated. This insulation is especially valuable when the new slow-heating gas is used for casting.

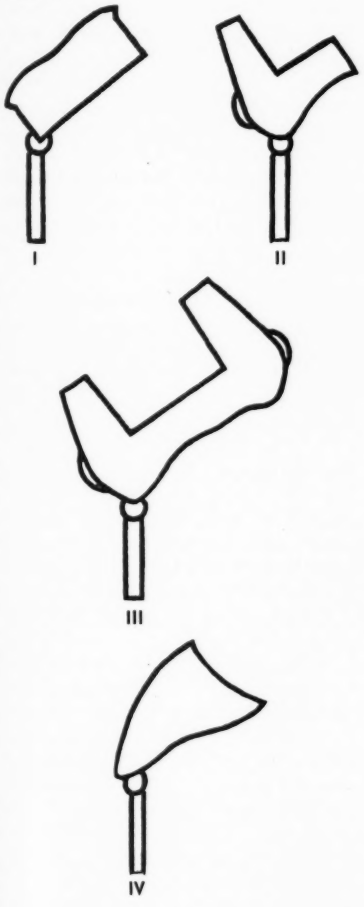
5. Inlays do not have to be dug out of the investment with a knife. The double coil permits the entire mass of investment to be pushed out of the ring with finger pressure after casting.

Correct Spruing

The correct spruing of a pattern is always an important factor. Dentists will take a great deal of time and care to secure a good pattern, and then, often immediately ruin it by careless spruing. A sprue introduced into a pattern with heat and pressure invariably invites distortion, and all the care used in obtaining a good pattern and carrying out a precision technique is nullified. A tiny bead of wax should be added, into which the sprue may be embedded so that any distortion can be practically confined to this little addition of wax.

The sprue should be placed correctly in relation to a pattern. In this technique, correct spruing aids (a) in the proper introduction of a pattern of any shape into the investment; (b) by avoiding the placing of the sprue on contact points much time can be saved, because just the right amount of wax can be added there and the contact point can be almost immedi-

ately shaped correctly, thus obviating much grinding and fitting of the casting. (c) The marginal ridge is the best place to sprue any proximo-occlusal or M. O. D. pattern. The accompanying diagram shows the preferred methods of spruing for any technique. (d) Because of the cup-like shape of internal surfaces of patterns made for the typical M. O. D. metal dies, these are best sprued on the occlusal surface near the buccal or lingual margins, equidistant from the mesial and distal surfaces, with the sprue well inclined away from the occlusal surface to avoid trapping of air during investment. (e) Full crowns should be sprued close to the gingival margin with the sprue well inclined away from the occlusal surface for the same reason.



Correct spruing: I. A simple occlusal pattern sprued on the cavity surface. Note the added bead of wax into which the sprue is embedded in all patterns. II. A proximo-occlusal pattern sprued at the marginal ridge. The addition of the correct amount of wax at the contact points obviates grinding at those points in fitting. Note that the flow of gold is directly toward the gingival margins in II, III, and IV. III. An M. O. D. pattern, similar to II. IV. A three-quarter crown sprued on the lingual surface near the incisal edge.

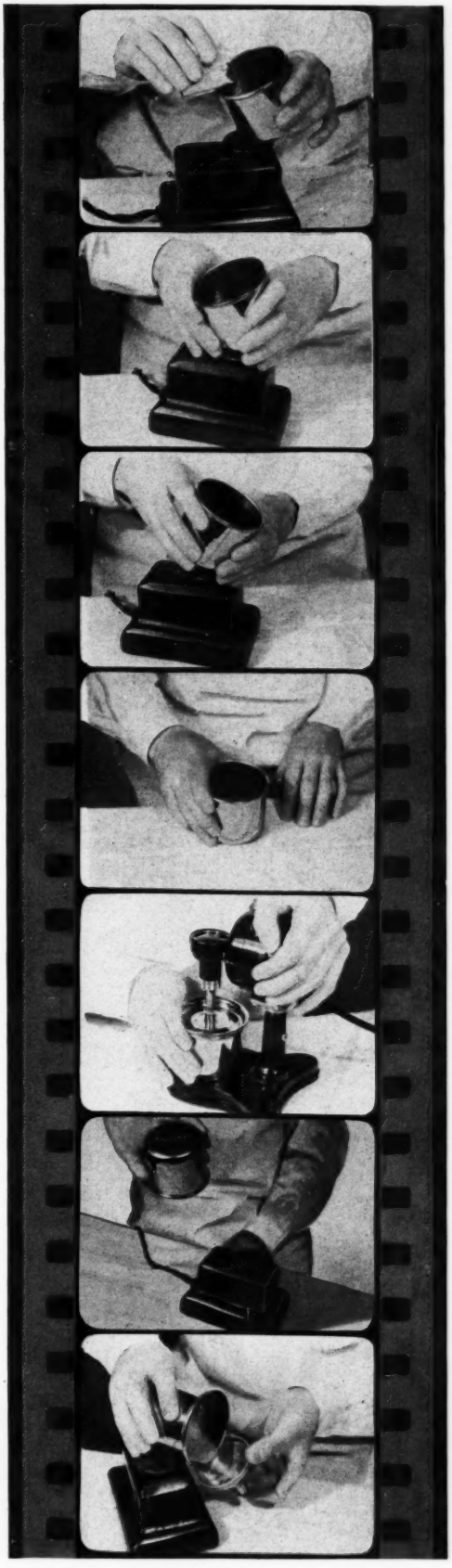


Fig. 15—Gradually sifting a definite amount of powder into the water under vibration.

Fig. 16—Mixing the investment by mere vibration. Note that there is no spatulation until the powder is thoroughly incorporated with the water.

Fig. 17—Mixing by tilting the bowl from side to side under vibration.

Fig. 18—The bowl is tapped sharply on the bench at intervals to break up surface bubbles.

Fig. 19—Spatulation (about twenty seconds), after which vibration of the mix and tapping of the bowl on the bench are repeated as illustrated in Figures 16, 17, and 18.

Fig. 20—Note thick consistency of mix.

Fig. 21—Filling the funnel. A small amount of investment is first vibrated into the small neck with the funnel well inclined to prevent trapping of air. Lower opening is stopped with a finger.

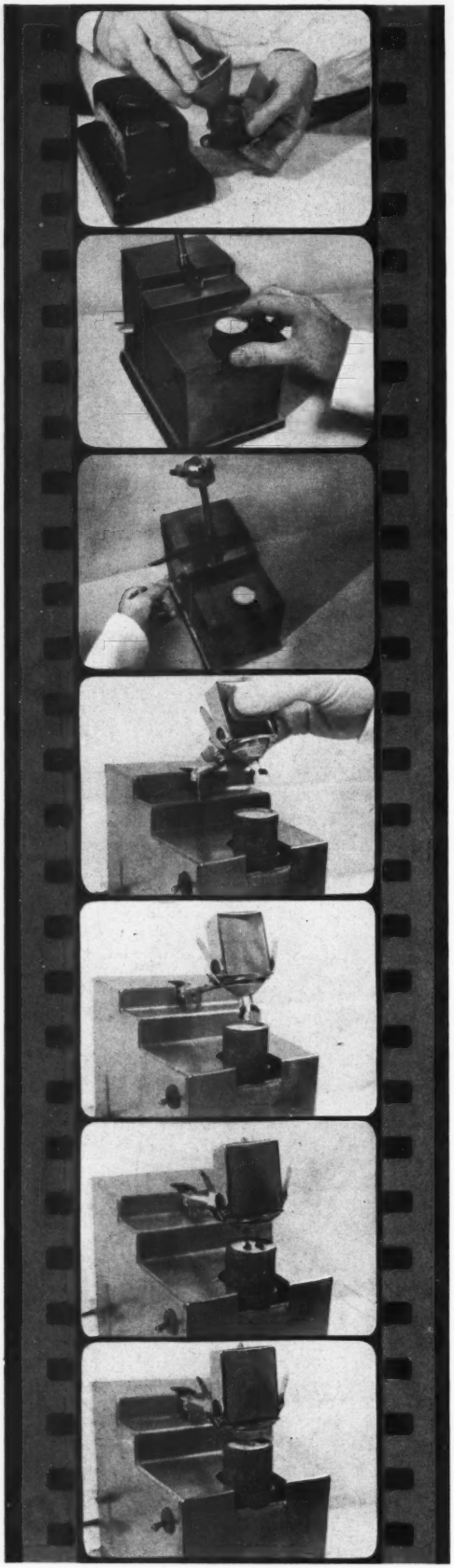


Fig. 22—Filling ring from bottom to avoid trapping of air in heavy investment.

Fig. 23—Placing filled ring in machine.

Fig. 24—Pressing the starting lever.

Fig. 25—Dropping investing arm into working position.

Fig. 26—Automatic investing arm movement and vibration start at this point.

Fig. 27—Patterns partly embedded.

Fig. 28—Patterns fully embedded.

The machine can be used with or without a water bath, depending on the total setting and thermal expansion of the investment used. There is much variation in expansion of commercial inlay investments, and this is the main determining factor of bath temperatures when water baths are used.

Casting results should be checked with metal dies, especially to determine the water bath temperature required with the particular investment used.

Correct Mixing of Investment

No matter what investing technique is used, the ability to make a bubble-free investment is of prime importance. Bubbles in the investment are always a source of danger no matter how the investment is applied to the pattern. The following method of mixing has been found to yield the most satisfactory results:

1. A measured amount of water is placed in the mixing bowl.
2. With the bowl under vibration, the exact amount of investing powder necessary for the thick mix is gradually sifted into the water.
3. The bowl is tipped slowly from side to side without any spatulation until the water and powder are fairly well mixed by mere vibration.
4. The bowl is tapped sharply on the bench to break up any surface bubbles that appear.
5. Mix thoroughly with a mechanical spatulator for twenty to thirty seconds.
6. The bowl is replaced on a vibrator, again slowly tipping the bowl from side to side, and intermittently tapping the bowl smartly on the bench to break up all surface bubbles that may appear.
7. A small portion of this bubble-free investment is vibrated into a well inclined funnel.
8. With the funnel in position and with a finger closing the small opening at the end, this investment is vibrated down along the side of the small neck of the funnel so as to fill it slowly from the bottom without trapping any air.
9. The bowl is then replaced on the vibrator, and the remainder of the investment is quickly vibrated into the larger part of the funnel.
10. The small end of the funnel is now placed deep down into the ring which is filled from the bottom with a heavy mix without trapping air by lightly touching the large end of the funnel against the vibrator.
11. The ring is thus perfectly and

gradually filled to within one eighth inch of the top and is now ready to be placed in the investing machine.

Description of the Machine

The machine occupies a rectangular space on the bench of a little less than 5 by 8 inches and is 6½ inches high. It is practically of all metal construction, and plugs into a regular 110 volt outlet.

On the top of the machine there is an arm pivoted near the back end. This is called the "investing arm," and the free end can be dropped down over the "ring receiver" or thrown back out of the way. On this free end of the investing arm is the "vibrating head" which houses a small vibrator, and to which are attached two little clips that grasp the crucible former with its mounted patterns. When these clips are pinched together, the crucible former can be slid into a rounded receiver; releasing the clips permits them to snap back and hold the crucible former tightly in place on the head. A small transformer within the cover puts out a 6 volt current to the vibrator by means of a small wire passed through the tubular investing arm.

When the investing arm is down, it is directly over the ring receiver, a groove so shaped that the ring is easily placed in a correct relative position to the mounted patterns. This ring receiver is part of the top of the machine.

When the lever at the left is pressed, it not only turns on the current to the little vibrator but at the same time starts the automatic timing device which raises and lowers the investing arm. An automatic "cut off" turns off the current to the vibrator a few seconds after the investing arm has embedded the patterns for the last time and has placed the crucible former down on the ring. It is therefore unnecessary to turn off the machine or to remove the cord from the outlet.

The timing device is under the cover and is set to carry out all the various up and down movements of the investing arm in a little more than a hundred seconds. It slowly turns a cam inside on which there is running a little roller which raises and lowers the "arm actuator." The upper end of the arm actuator is seen as a small projecting strip of metal near the center of the top and has a small roller bearing for contact with the dropped investing arm, the embedding movements of which it controls. A small spring pulls the cam roller away from the cam except when the invest-

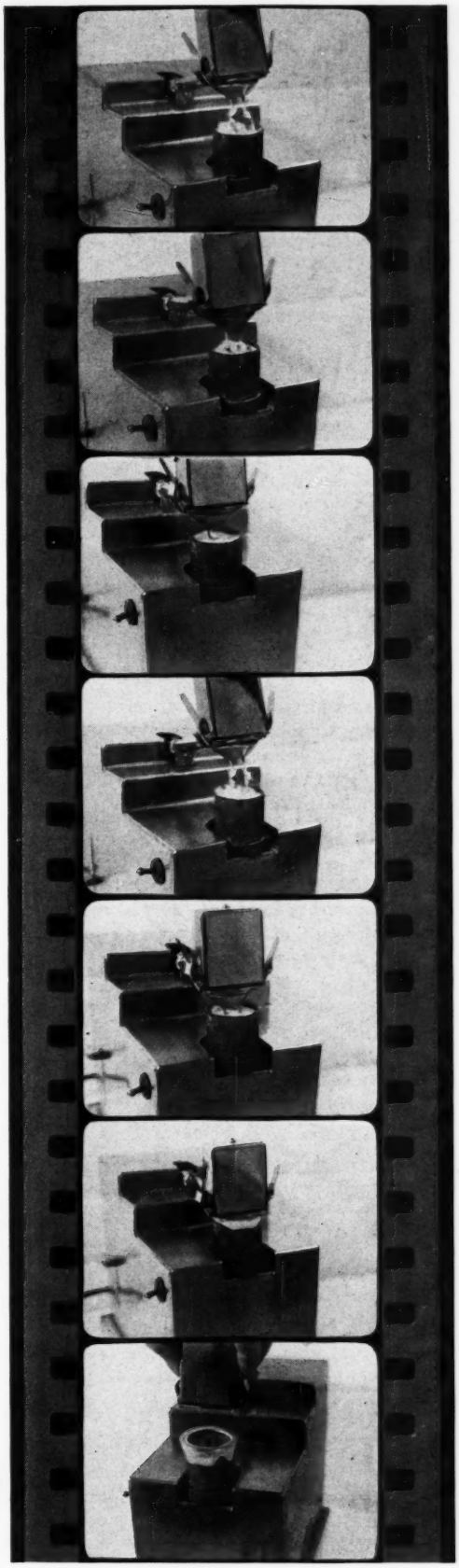


Fig. 29—Patterns raised up and out of investment. Note the adhering investment.

Fig. 30—Patterns being embedded the second time.

Fig. 31—Patterns embedded the second time.

Fig. 32—Patterns removed the second time.

Fig. 33—Patterns being finally embedded.

Fig. 34—Crucible former being automatically placed into position on the ring. Movement of investing arm and vibration cease at this point.

Fig. 35—Removing the vibrating head, the investing process having been completed.

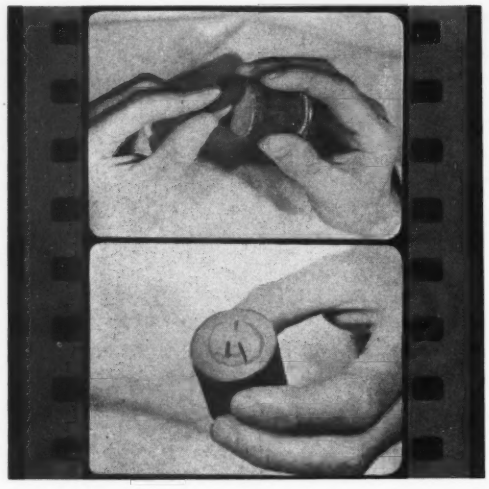


Fig. 36—Snapping rubber cap off ring; investment has set.

Fig. 37—Crucible former removed.

ing arm is dropped. The weight of the investing arm brings this roller against the cam. After the machine is turned on and the investing arm dropped, the position of the arm actuator is such that the patterns cannot reach the investment for several seconds and thus protects them from any sudden plunge into the investment. In other words, the investing arm can go down only so far, and the patterns are held well above the ring for several seconds.

The small switch at the left is independent of the investing arm and supplies current only to the vibrator. This is used only in case too heavy a mix of investment has been used and a little more vibration is wanted in the head to seat the crucible former down farther on the ring. Thus vibration can be produced without any arm movement.

The head clips are designed so that, after investment, pinching them together will release the crucible former from the vibrating head which is then thrown back, leaving the crucible former remaining on the ring.

Investing Patterns with the Automatic Machine

1. The crucible former is placed into the receiver with its clean, dry patterns, and the investing arm is thrown back and out of the way.

2. A rubber end-cap is snapped on one end of the ring.

3. The asbestos coil is placed in position and moistened with a wet brush.

4. A heavy mix of investment is made, and the ring is filled almost to the top as described previously.

5. The ring is placed into the ring receiver of the machine.

6. The lever on the left is pressed all the way down.

7. The investing arm is dropped with its patterns over the ring.

8. The automatic investing machine then thoroughly invests the patterns.

9. The two clips on the vibrating head are pinched together, and the investing arm is lifted away from the crucible former and ring.

Summary

1. The machine automatically carries out the investing process, correctly timing each movement, and, with continuous, fine, high frequency, pattern vibration, twice embedding the pattern into the mix (the first time very slowly) so as to assure complete distribution of the investment over the entire surface of the pattern, and twice raising the pattern up and out of the investment to dissipate any bubbles in the investment which may be adhering around the pattern. Finally, the machine embeds the pattern, wet with bubble-free investment, fully into the ring, and places the crucible former down on the ring. When these operations are completed, all movement and vibration cease, and the current shuts off automatically.

2. The current remains turned off until the machine is used again.

3. Movement of the embedding arm and vibration of the crucible former receiver are started simultaneously by pressing the starting lever.

4. The machine can be plugged into a regular electrical outlet.

5. The pattern and the filled ring are always in correct central relationship to each other so that the patterns cannot strike the side of the investing ring.

6. Two, three, or four patterns can be invested as easily and quickly as one.

7. Patterns are not so easily knocked off the sprue as in other techniques, because of the fine vibration of the pattern.

8. The method described here is a cleaner method of applying investment than others.

9. A single mix is used.

10. A heavy mix is used.

11. Full radial setting and thermal expansion of investment are provided by the coiled asbestos strip-lining in the ring.

12. Full longitudinal expansion of investment is provided by a rubber expanding cap at one end, which is water-tight, permitting the use of a water bath, if desired; but this investing method can be used with or without a water bath.

13. The machine saves investment because several patterns can be invested in one ring.

14. The machine eliminates bubbles.

15. Investing requires about 100 seconds. The machine saves a great deal of time from every standpoint.

16. The machine works automatically, and is so simple to operate that any assistant, after a few minutes' instruction, can do it just as well as the expert technician.

The Editor's Page

IN the moving picture adaptation of the Pulitzer prize novel *Arrowsmith*, a country doctor is shown extracting a tooth for a little lad by the piece-of-string method. This scene is amusing and instructive, and is done without a show of the feeble humor that often represents the dentist in the cinema. We can hardly be expected to learn much from "Doctor Arrowsmith's" operative technique, but the talk that he gives the boy, friendly and informal without the pontifical tone, is splendid. In substance, "Arrowsmith" says: "Johnny, Nature gave us two sets of teeth. The first set was given us to practice toothbrushing on so we'll know how to keep the second good set clean; but I'm afraid, sonny, that you're not taking advantage of your opportunities. Here, I see, is a bit of the coconut pie that you had for supper last night." Then, he proceeds with the extraction.

Dentistry, in a few short years, has traveled a long road from this piece-of-string level of service. Not much more than a decade ago, dental care for the child comprised the extraction of teeth and the occasional placement of a filling—gutta-percha crammed into a partly excavated cavity, cement slopped into an excavation, or amalgam pushed with a generous thumb into a yawning hole. After treatment of this kind, the child was dismissed with certainly no invitation or incentive to return and often with such tacit words of discouragement to the parent: "They're only baby teeth." Or, perhaps, the child was entrusted to the beneficent powers of the biologic world, thus: "Nature will take care of these crooked teeth. Don't worry about them."

And so, the principle of *laissez faire* was applied to dental problems, and now we reap the harvest of such inaction: mutilated mouths all about us, deformed faces in every gathering, ill health everywhere.

In those days, not long past, what little was done for the child was usually done in a slipshod, hurried, painful fashion. Today, we meet adults who stand in fear and dread of the dental experience. Dimly, in the past, they remember with horror some visit to a dentist who "didn't have time for children." And we wonder, now, why it is difficult to make the public "dental-minded"!

On our dental society programs in those bygone days, we gave little or no time or attention to the subject of dental care for the child. The word "pediodontia" was unknown in our literature, or, at least, was uncommon. What consideration we gave the child was as a sentimental rather than as a physical entity. We talked pompously and with gilded oratory of what the child was entitled to and should receive. But most of us had our fingers crossed. To put it mildly, our behavior was paradoxical. We talked largely about the services that the child *should* receive, but, in our offices, many of us were unable or unwilling to give these services. Feebly, we pleaded that we were too busy, or that we couldn't be properly paid for children's dentistry. Another sad exhibit of our economic stupidity—clogging up the source of supply of future patients. "The child of today is the man of tomorrow" is an economic as well as a biologic fact.

We are still a long way from perfection, but conditions are greatly improved. We have made a splendid and a noble progress. Today, the child has an important place in dental practice and thinking. Research workers are patiently searching to learn the entire story of dental disease. Pediatricians are emphasizing the importance of a proper diet on the dental structures. We have developed a number of excellent specialists in pediodontia. Dentistry for the child gains an ever increasing interest on our dental programs. The dentist has an important place in our public school systems.

But to give adequate dental care to the child we need more than a knowledge of tools and materials, more than a technique, more than physical equipment. We must know the child, his nature, his behavior, his world. We must be understanding. We must see with him eye to eye. And above all, we must have a philosophy for our work; we should know the importance and the significance of our job.

The month of May is dedicated to the child. The symbolism of blossoms and budding life is rich in implications. It is our privilege and our responsibility to attend the child and make our important contribution to his health and happiness.

EVERY MONTH SHOULD BE CHILD HEALTH MONTH.

ELIMINATING MOUTH INFECTIONS WITH THE TOOTHBRUSH AND OTHER STIMULATING INSTRUMENTS

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Why is it necessary to resort to artificial gum stimulation?

Most pyorrhea pockets are located in protected locations, usually between the teeth; teeth in perfect contact offer protection to the home of microorganisms. If the teeth were naturally separated and had perpendicular sides, not V-shaped to retain food in a wedged position, the required stimulation would be had during mastication, which would be similar in action to a movable-removable bridge on the gum tissue.

What time in life should stimulation be commenced?

After the eruption of the teeth, positively not before. Massage of the child's gums with the finger before the teeth have appeared starts Nature in building up a resistive tissue which will greatly retard the eruption of the deciduous teeth. Stimulation should be brought into force in the child's life after the teeth have erupted.

The most important location to care for is the interdental tissue. The remaining gingivae, however, should by no means be neglected. It must be remembered that it is the duty of the dentist to prevent decay and sensitive dentin, as well as periodontal disorder.

How should stimulation be done?

The main instrument used is a properly shaped toothbrush. As further aids to stimulation, I use number 14 wire, sharpened to a slender point. These little instruments are made of copper, silver, gold, or composition metal. Dental floss is not used for stimulating purposes. It is impossible to meet the crest of the gum septum with the floss because it will enter between the soft tissues and the teeth instead; consequently, dental floss should be used only for the removal of fibrous foods from between faulty contact surfaces.

Procedure for Toothbrushing Instructions

1. The first sitting is devoted to the taking of an impression, and pouring a plaster model to be used in demonstrating to the patient. As the model is an exact reproduction of the patient's gums and teeth, he learns more readily the various angles at which to place the brush. He is allowed to take the model home for practice purposes. The disclosing solution is also demonstrated at the first sitting to such an extent that the use of this solution (equal parts of aconite and iodine) will become indelibly fixed in his mind; nothing else will convince the average patient that his brushing is ineffective. At this sitting he is given a practical demonstration, in his own mouth, which only covers the labial surfaces of the upper and lower anterior teeth and gums. The patient is allowed to watch the procedure with a mirror. After a few minutes he is allowed to take the brush to see whether he can manipulate it as he has been shown. It will be found that at first the patient will be unable to work the brush as he saw it through the mirror; consequently, he has to be aided by the teacher in making the proper corrections. After ten minutes of this instruction the patient is dismissed and told to return in two days, at which time a check-up is made of the results of the first lesson.

2. The second lesson, consuming about ten minutes, covers the buccal surfaces and the gum septum of the posterior regions.

3. The third lesson is set for two days later when care is given the lingual surfaces. More time is consumed with this lesson as it is concerned with the hardest location in the mouth to master.

4. When the various locations in the mouth have been covered, the patient is shown how to operate the additional gum-stimulating instruments —even children are told how to do this.

Instruments

The instruments for the apparently normal conditions are made of composition metal wire, number 14, sharpened to a slender point, and curved so that they may enter between the contact point and the gum septum without puncturing the soft tissue, but bringing pressure to bear on this tissue.

In cases in which there is gum resorption and openings forming between the teeth, the lowly toothpick is returned to the armamentarium as a great aid in preventing and relieving gum infections. The toothpick should be reshaped to fit the interdental space freely and still be left strong enough to create a considerable pressure on the gum septum. If there is considerable gum recession and congestion, a small amount of cotton should be wound around the pick to act as a cushion on the tender tissue.

A normal gum condition is handled the same as if it were a case of minor irritation. If it is true that the great majority of persons in middle life have gum or tooth defects, would it not be perfectly reasonable to treat a normal, as well as an abnormal condition, and thereby prevent tooth and gum disorders?

Method of Brushing

1. The brush is placed at a 45° angle to the long axis of the teeth, being careful not to pierce the gums with the points of the bristles.

2. With the bristles between the teeth, as much pressure as possible is exerted, giving the brush several slight rotary or vibratory movements. This causes the sides of the bristles to come in contact with the gum margin, producing an ideal massage. This movement, however, should not be sufficient to remove the bristles from their position.

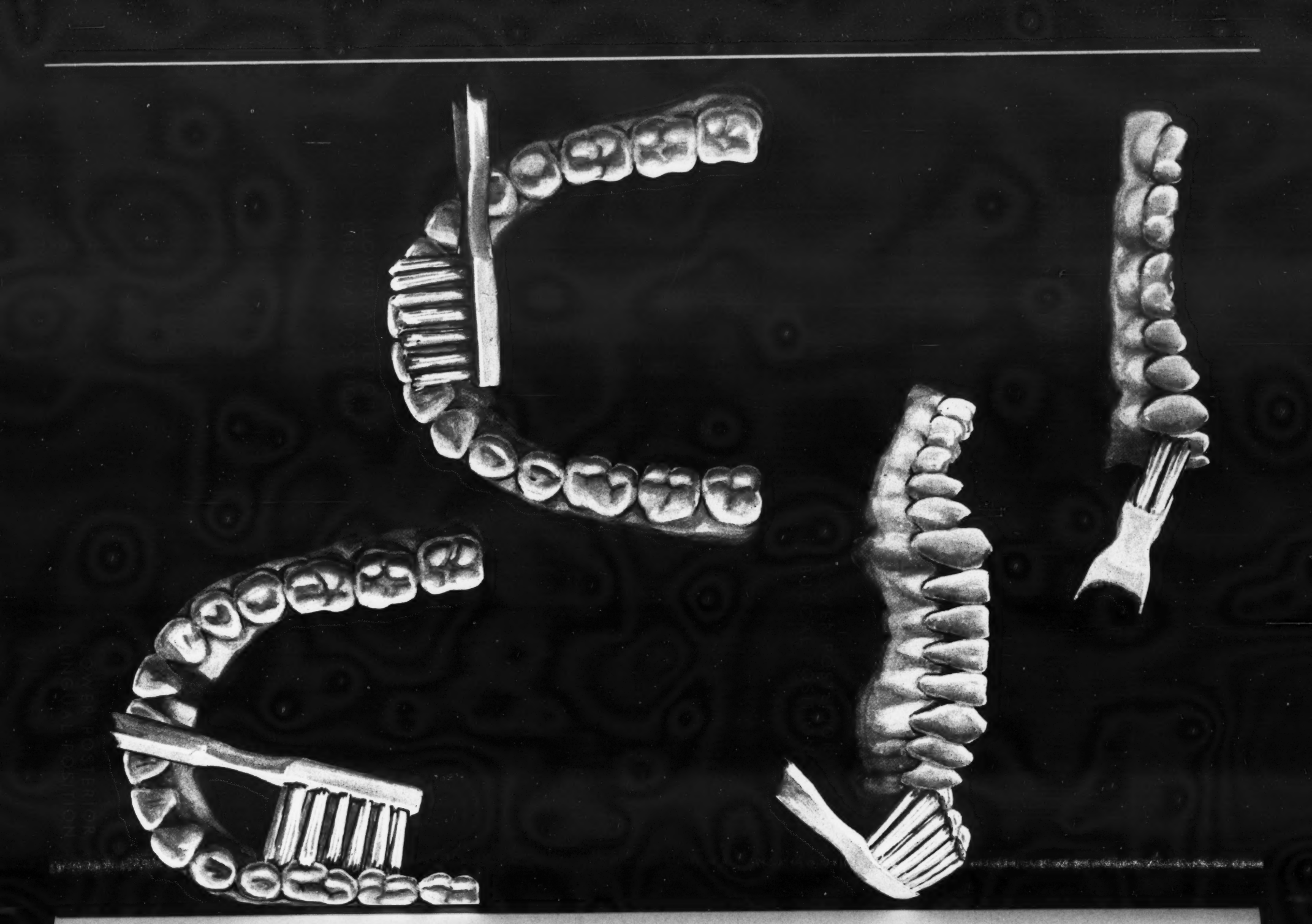
3. After three or four small circles have been made, the brush is removed and replaced in the same position, making three or four applications in the same place. The reason for this is that the points strike the labial, lingual, and buccal surfaces, then slide into the interproximal spaces.

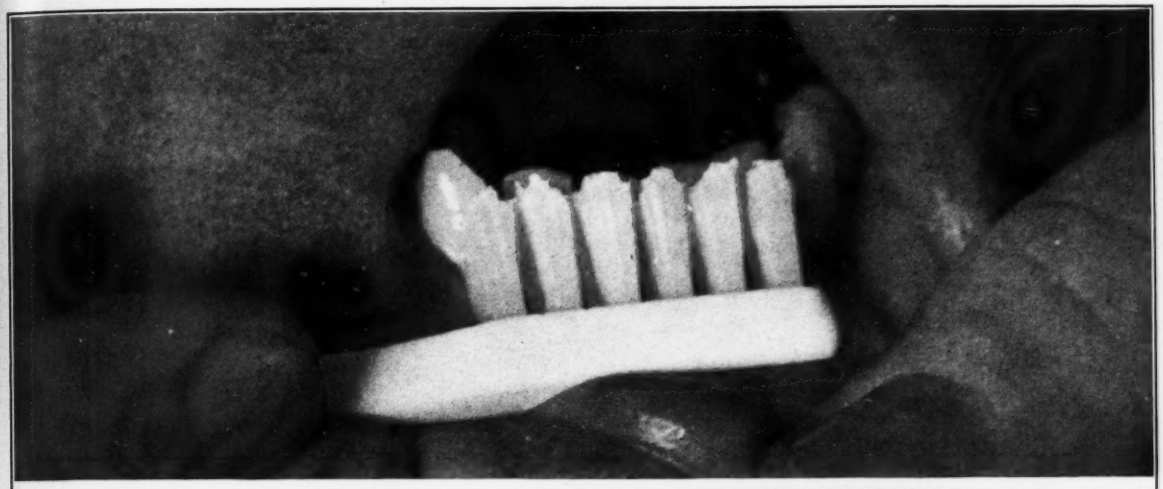
4. The same process is repeated, moving the distance of one embrasure, and holding the sides of the bristles against the gingivae or gum margin. Care should be taken to enter every embrasure or space on both upper and lower teeth.

5. The chewing or grinding surface should not be brushed with a sweeping or sliding motion, but the brush should be placed directly upon this surface, giving a slight rotary movement after the bristles have been gently forced into the pits and fissures.

6. The brush is then removed, and the process repeated until the entire chewing surface has been cleaned.

(See illustrations on following six pages)





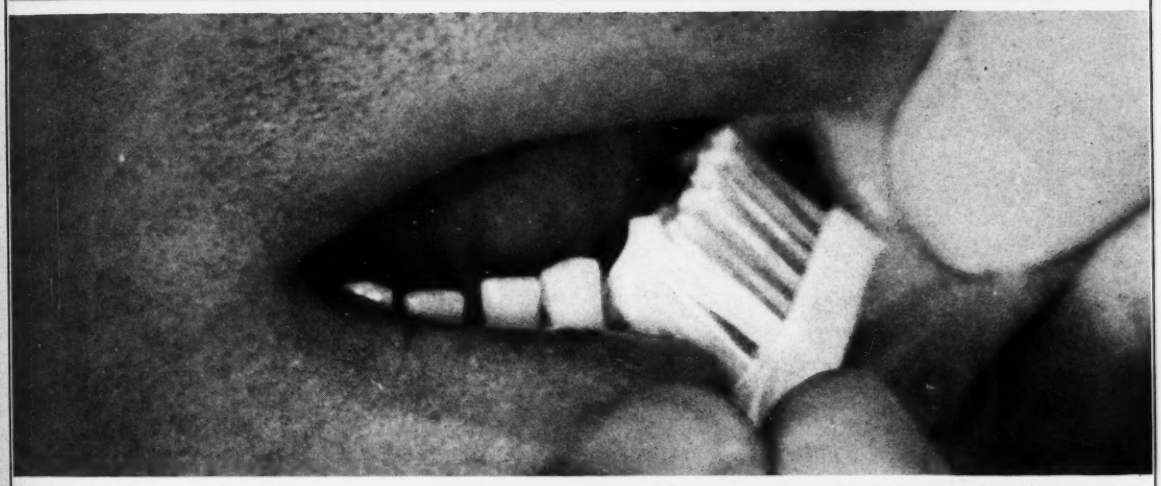


Fig. 1—Lower anterior labial position. Brush at a 45° angle to long axis of tooth; bristles between the teeth. Pressure produced without bending the bristles and without piercing the gums. Vibratory movement rather than stroking. Result: Interdental stimulation.

Fig. 2—Lower posterior buccal position.

Fig. 3—Lower anterior lingual position.

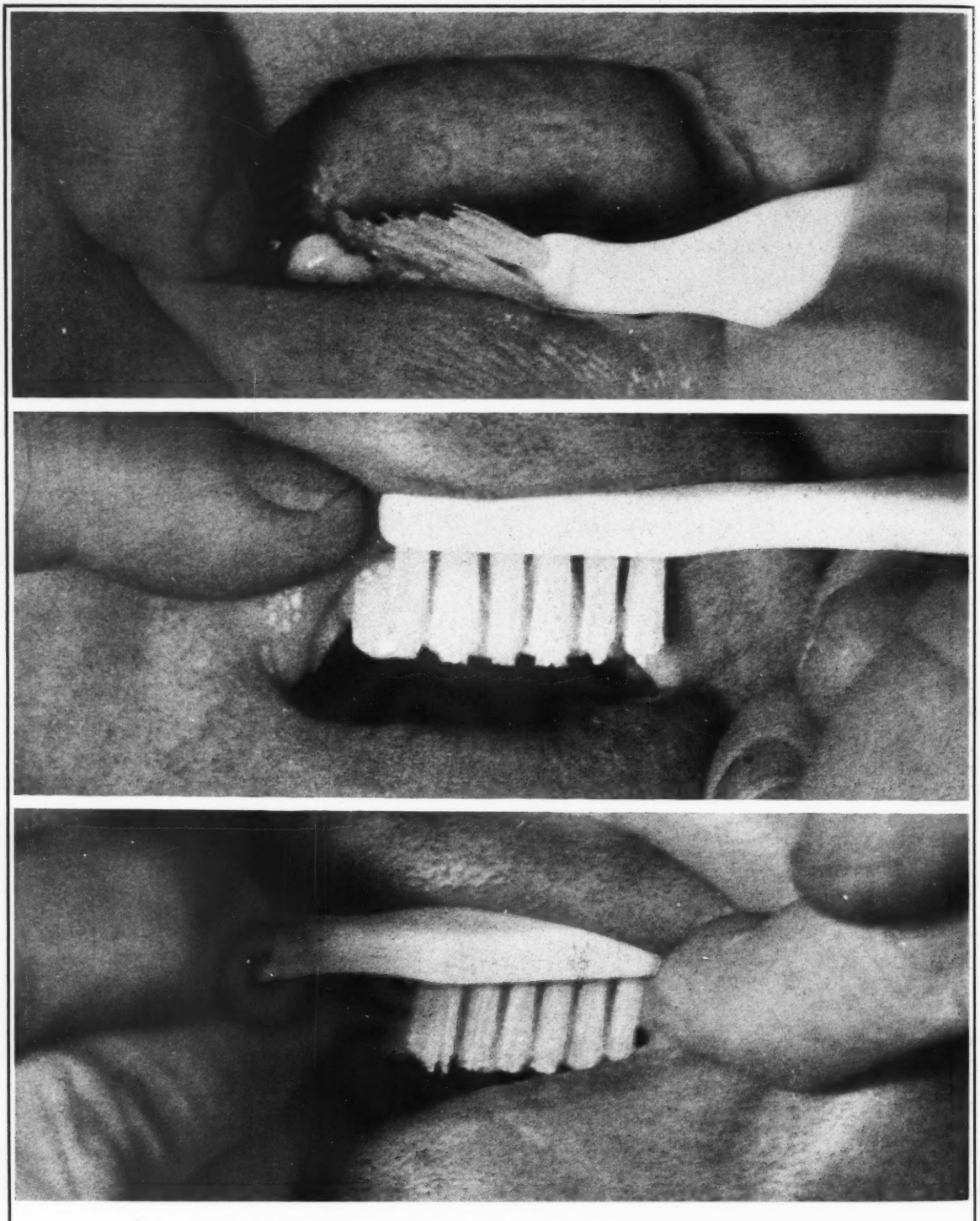
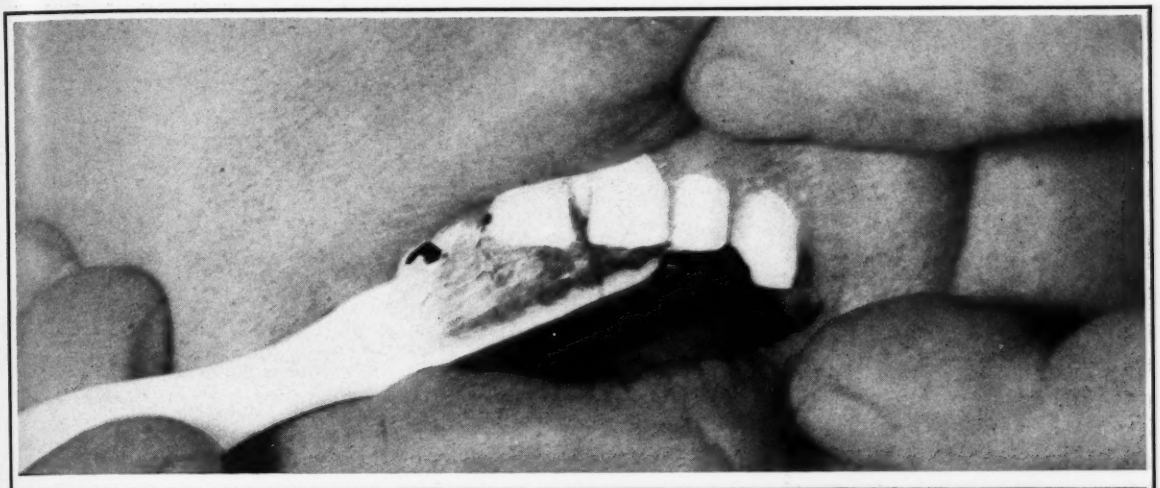


Fig. 4—Lower posterior lingual position.

Fig. 5—Upper anterior labial position.

Fig. 6—Upper posterior buccal position.



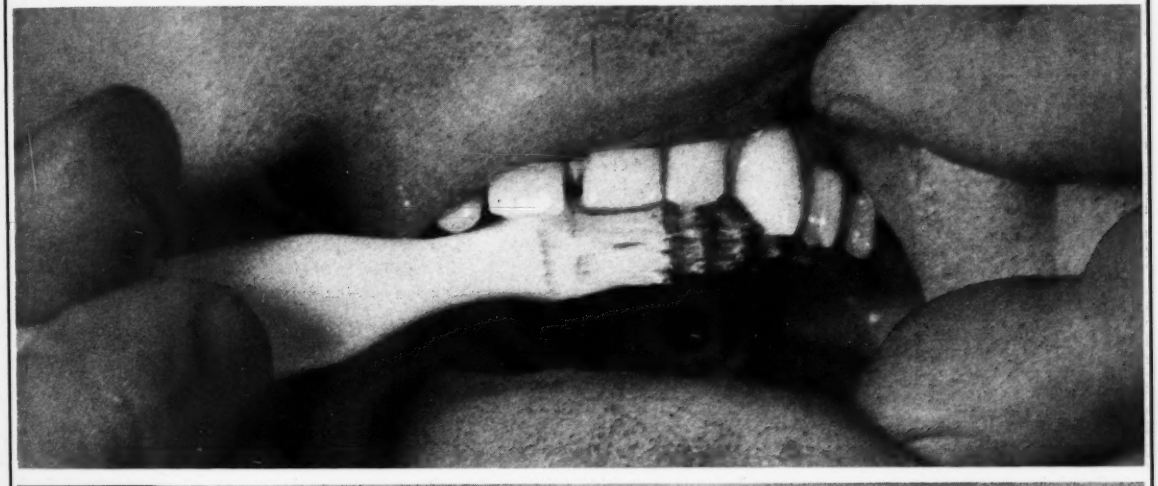


Fig. 7—Upper anterior lingual position.

Fig. 8—Upper posterior lingual position (used by dentist).

Fig. 9—Metal probe inserted between the teeth. Intermittent pressure applied (pumping action). Result: Stimulation of circulation in interdental tissues.

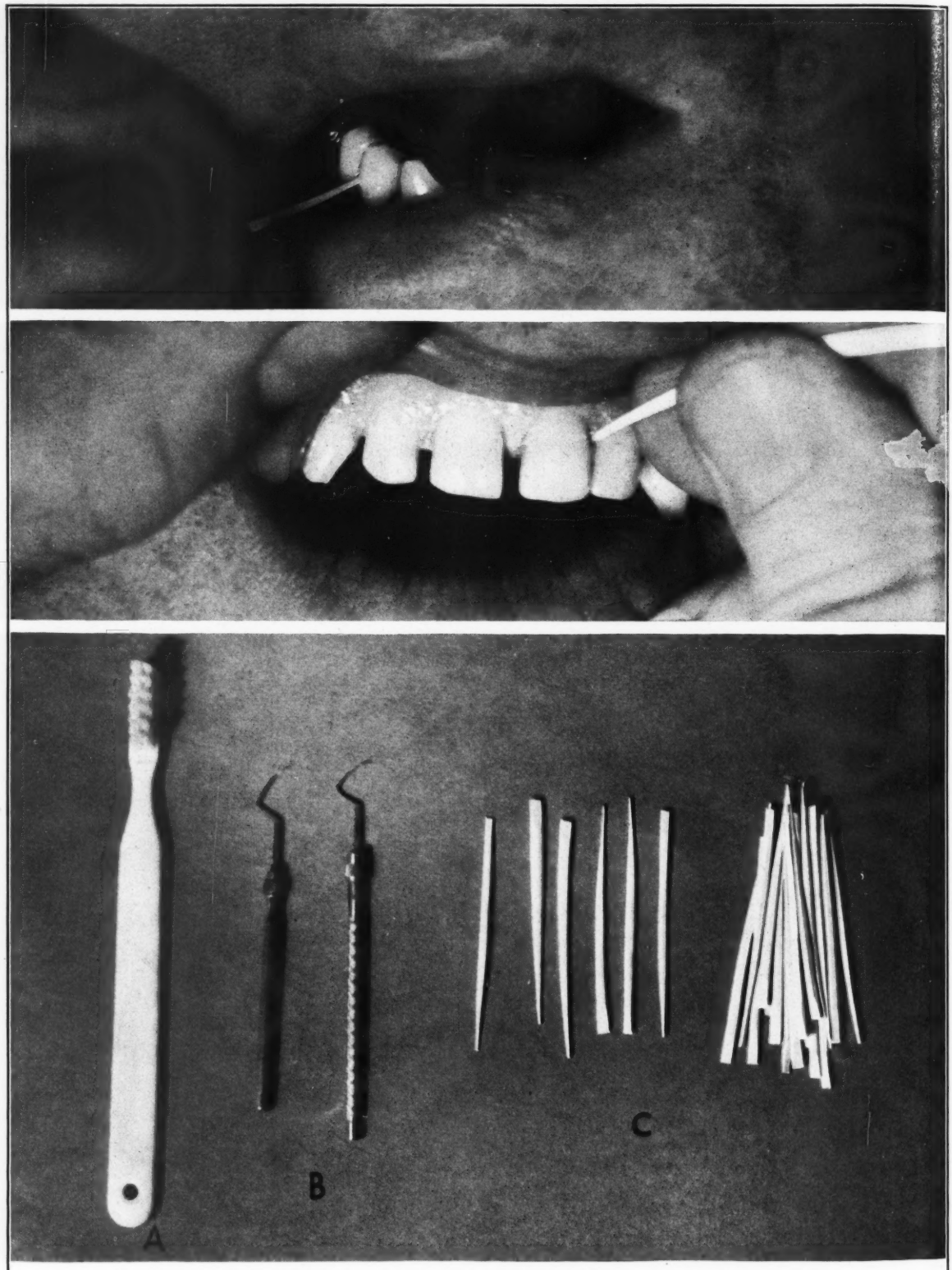


Fig. 10—Use of toothpick (by patient). Lower posterior position. Intermittent pressure applied to septal tissue.

Fig. 11—Use of toothpick (by patient). Upper anterior position.

Fig. 12—A, One proper type of toothbrush. B, Metal probes for stimulation. C, Toothpicks for interdental stimulation.

CAVITY PREPARATIONS FOR ABUTMENTS AND INDIVIDUAL RESTORATIONS

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IN the light of our present knowledge regarding advanced forms of dental restoration, the subject of cavity preparation commands considerable attention and presents a different conception from that which was held for many years after Doctor G. V. Black in 1897 presented the fundamentals of preparation to the dental profession.

As the late Doctor Kells wrote, "Cavity preparation followed the whim of each dentist and the cavity naturally assumed a shape or form in proportion to the amount of decay that was present in the tooth."

What Doctor Black presented as a standard cavity preparation was applicable to the filling of teeth with amalgam or gold foil. Cavity preparations for the reception of abutment pieces as retaining elements had not yet appeared.

Aside from the gold crown or the post crown and their variations, there were no other forms of abutments. It remained for the introduction of the casting process into dental practice to open up new avenues and possibilities for dental reconstructions. The casting process has made it possible to construct more efficient and more esthetic restorations. Not only can better forms of retaining elements be obtained but also more consistent types of pontics that conform as closely as possible to the natural tooth.

Through the agency of the wax pattern, dentists of ingenious minds and manual dexterity have conceived newer and better ways of obtaining anchorage in the natural tooth substance without affecting either appearance or vitality. It required courage to deviate from the accepted order and devise methods of cutting the tooth structure to the minimum and still retain a maximum of retention. A great deal of research was also necessary to develop gold alloys that would offer the greatest resistance to masticatory stress and torsion in a consistently minimum amount of mass.

For several years I have observed that many of the presentations on the lecture hall screen show preparations on teeth unmarred by caries or other destructive forces. While it might be ideal to be confronted with such conditions, more often than not our problems are not so simple as that, but rather complicated by the fact that when the dentist's services are called for, the teeth in question have already undergone ravages of one kind or another, and it requires individual ingenuity to devise retention forms in such abnormal teeth.

In the construction of any type of dental restoration, one must determine the amount of work that each tooth serving as an abutment will be called on to perform; also, how much work the restored members will have to do owing to the various masticatory forces exerted in the excursions of the mandible. Thus, when cavities are being cut, these conditions should be kept in mind.

Classification of Preparations

I. Anterior hoods or veneers:
  A—Three-quarter veneer crowns.
  B—M. L. D. preparations.
II. Anterior hoods with pins:
  A—Pinledge.
  B—Pitledge.
  C—Pin veneer.
  D—D. I. or M. I. preparations of anteriors with pins.
III. Anterior post castings:
  A—M. L. D. preparation with post in canal.
  B—Complete lingual preparation with post in canal.
IV. Posterior hoods: Three-quarter crowns on bicuspids and molars.
V. Posterior pinlays: Preparations of two-surface character with the addition of pins for added anchorage.
VI. Compound cavity preparation on posteriors: Two-surface preparations, including extensions to the buccal and lingual sulci.
VII. Complex cavity preparations on posteriors.
VIII. MacBoyle preparations on posteriors.

Three-quarter Veneer Crown on Upper Central

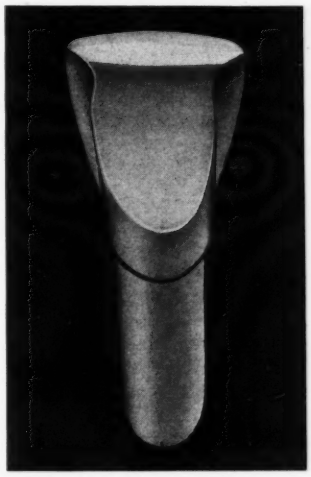

Fig. 1—Lingual view of three-quarter preparation on an upper central incisor.

Materials and Instruments—1. Carborundum discs, flat and cup-shaped.
2. Lightning metal discs.
3. Carborundum paper discs.
4. Heatless stones.
5. Mounted carborundum points.
6. Crosscut tapering fissure burs.
7. Soft copper bands, 36 gauge.
8. Modeling compound.

Procedure—1. Each proximal surface is sliced with a carborundum disc when both surfaces are not in contact with an adjoining tooth. When one of the surfaces is in contact, separation is first obtained with the use of the metal lightning disc, one surface of which is safe-sided to avoid marring the other tooth. The disc should be held in such a position that the surfaces created should converge slightly toward the lingual. If this is done, the labial contour will not be destroyed.

2. The lingual surface is dressed down to clear the occlusion not only when the mandible is at rest but also during lateral and protrusive excursions.

3. The linguo-gingival curvature is reduced to eliminate any undercuts and to meet the prepared planes of the proximal and lingual surfaces.

4. The incisal edge is beveled to a

45° angle with a mounted carborundum wheel stone (Miller's mounted point, number 267).

5. The proximal grooves running from the incisal to the gingival are made with fissure burs, numbers 1, 2, and 3. The depth of the groove depends on the size and bulk of the tooth in question, and at all times should be within the dentin mass and not in the enamel. The direction of the groove should be in a line parallel with the labial surface of the tooth, for in this manner the longest distance possible is obtainable. Care should be taken that the two grooves are parallel to each other.

In my own experience, I have found that the use of right angle burs in the angle piece for making these grooves permits a better view of the field than when the straight handpiece is used.

It will be obvious when Fig. 1 is examined (lingual surface) that to avoid destroying the labial contour of the tooth, parallelism is obtained by reducing the mass at the incisal area to the same width as at the gingival.

All surfaces in the long axis of the tooth behind the enamel wall are parallel to one another.

6. When all general cutting has been completed, all the surfaces are gone over with mounted points (numbers 28 and 29 for the grooves, and other suitable sizes for broader surfaces) to remove all roughness unavoidably produced by the use of the crosscut bur. A cut surface that is absolutely smooth will yield a smooth impression and subsequently a well finished abutment piece.

In earlier days, the three-quarter crown preparation included the V-shaped groove across the incisal edge where now the bevel is suggested; also, a shoulder was formerly made on the gingival, extending around the lingual from groove to groove, whereas today, a well adapted featheredge is more acceptable.

The purpose of the incisal groove was for added retention and as a measure against lingual displacement. Because of better and stronger gold alloys than were formerly had, such additional anchorage is unnecessary. Furthermore, by eliminating the incisal groove, the appearance of a blue or grayish shadow, produced by the reflection of the gold behind the incisal edge, is prevented.

7. The impression for this preparation may be taken by either the direct or indirect method. Although the indirect-direct is the one of choice in this instance, it would seem preferable to carve a wax pattern on a prepared die than to labor under the difficulties presented by various mouth conditions and abnormalities.

(a) A copper band is selected and fitted to the tooth; (b) most of the labial surface is cut out. (c) Compound is softened, and the band filled. (d) The surface to come in contact with the preparation is glazed over the flame and then brought to place. All the surplus will ooze out through the labial, and a full view is always had of the tooth. The cutting out of the front of the band avoids the undercuts of the tooth contour. (e) As the compound sets, the surplus is cut away with a sharp knife blade or lance, the cuttings being done toward the tooth; at the same time, all surplus is removed beyond the actual margins of the preparation. In this manner, the impression can be removed with the least amount of distortion, or with the absence of any distortion. (f) The impression should be examined for any deficiency; it should present a clear and definite picture of all prepared surfaces.

8. An amalgam die is made by any of the accepted methods, preferably the one in which the impression is embedded in plaster in a metal ring and excess mercury removed by means of pressure.

9. When the die is ready, it is cleaned of surplus mass; the preparation is oiled slightly with some suitable lubricant, and a wax pattern carved on the die.

10. The pattern is then removed and placed on the tooth, and adapted as though it were a direct impression.

11. When satisfactory, it is carefully removed from the tooth, but not replaced upon the die; instead a casting sprue is attached. The pattern is then ready for investing and casting.

12. The use of the mechanical or motor spatulator is recommended together with warm water for the investment mix, and the use of the water bath to obtain the wax expansion.

13. Elimination of the wax is done with the boiling-out method, and the casting, in a centrifugal machine.

It is recommended that all abutment castings should be of gold alloys having not less than 8 per cent platinum palladium content to assure proper strength and stiffness and yet permit of good marginal adaptation.

No special comment should be needed as to the application of the three-quarter crown because of its widespread use as an ideal anchorage in fixed bridgework for anterior restorations.

A variation of the three-quarter crown is one in which a step is created on either the mesial or distal surface, depending on which is adjoining an edentulous space where teeth are to be restored and some proprietary attachment is to be anchored in the abutment piece. Although such conditions will occasionally be found for its use in a central, it is more often applied to the cuspid (Fig. 2).

Substitution of Step for Groove

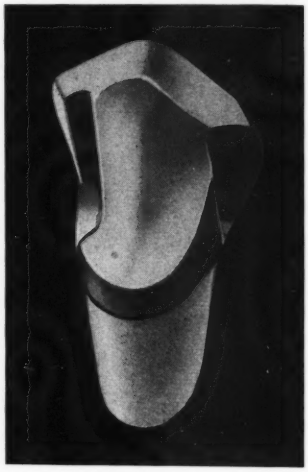

Fig. 2—Lingual view of an upper cuspid with a step used in place of a groove on one of the proximal surfaces (left of picture).

The extent of the step is dependent on the type and size of the attachment to be used, but the general preparation for the upper cuspid is similar to that described for the central. The step is used in place of one of the grooves. An amalgam die is made and the wax pattern carved. A step is carved in the wax so that sufficient room is allowed for the placement of an attachment in the finished casting.

Pinledge Preparation

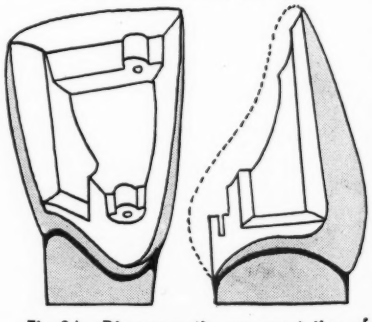

Fig. 2A—Diagrammatic representation of the use of the pinledge preparation with only two pin channels and a box step on one of the proximal surfaces. Modification of pinledge to receive precision attachment.

To augment the retention of the pinledge preparation because of the strains to which the abutment is subjected and the resultant possibility of loosening, one or two pins (pin wire, 25 gauge) may be inserted in the floor of this step to obtain additional anchorage.

M. L. D. Preparation

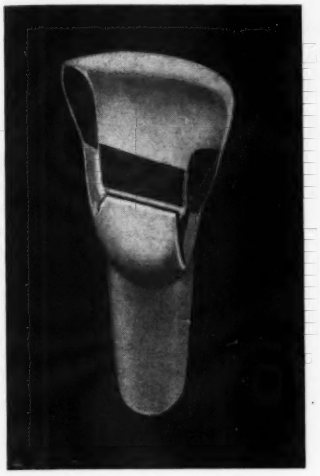

Fig. 3—M. L. D. on an upper lateral.

A preparation of M. L. D. character is shown on an upper lateral in Fig. 3. The tooth usually being small and thin offers scant opportunity for proper anchorage when only one surface is used. Even if the preparation is for auxiliary retention to carry a flexible or movable joint, it is advisable to extend the cutting to more than one surface. A small and shallow preparation will permit an abutment piece to become dislodged because of insufficient retention. Lingual preparations, which are necessarily of shallow character, I have found to be inadequate for abutment purposes. Frictional resistance is of utmost importance for good retention and can only be obtained by cutting in line with the long axis of the tooth.

Modification of Veneer Crown

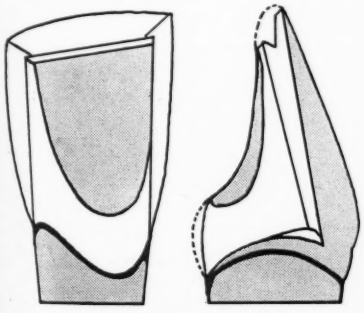

Fig. 3A—A modification of the veneer crown with an open lingual surface; groove on incisal edge.

Anterior teeth are often found to be very thin, translucent, extremely convex on the labial surface and concave on the lingual, and more often than not, accompanied by a close interlocking bite. Nevertheless, some means for suitable anchorage must be found in such teeth to meet the need of the restoration indicated.

Pin Veneer

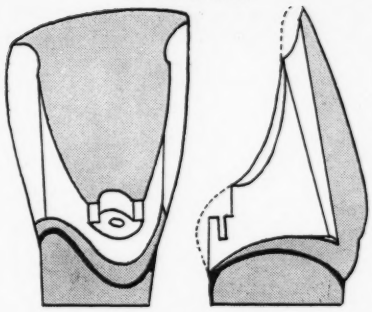

Fig. 3B—Pin veneer preparation with an open lingual surface for thin anterior teeth.

Fig. 3 A represents a modification of the veneer crown with the lingual surface not included in the preparation but with a V-shaped groove on the incisal. This groove meets the proximal grooves which are prepared in the usual way. The resultant casting has an open lingual surface and the incisal edge is spanned by a strip that fits into the V-shaped groove. A casting of this character should be made of a stiff gold alloy.

Pin Veneer

In Fig. 3 B, which may be rightfully named "pin veneer," the preparation consists of two proximal grooves and a pinledge and channel on the linguo-cingular area. The lingual surface and the incisal edge, as will be noted in the illustration, are not covered by the casting. As in Fig. 3 A, a stiff gold alloy is essential in making the casting.

Three-quarter Veneer Crown on Lower Cuspid

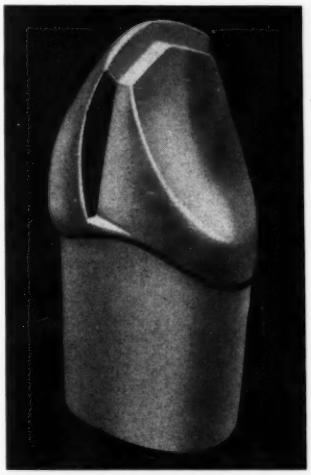

Fig. 4—Three-quarter veneer crown on lower cuspid; three-quarter view.

The special emphasis on the veneer crown for the lower cuspid is made because of the lingual inclination of this tooth in a great number of cases. The position of the grooves must be changed here slightly to avoid difficulties when the piece of bridgework for which these veneers serve as abutments is inserted; *whereas the groove in an upper cuspid and central is made in a plane parallel to the labial enamel plate, in this instance the grooves are made in line with the long axis of the tooth* and will, therefore, permit vertical insertion.

The instruments for the preparation are similar to those described for Fig. 1, and the construction is done in the same manner.

Three-quarter Veneer Crown as Viewed from Lingual

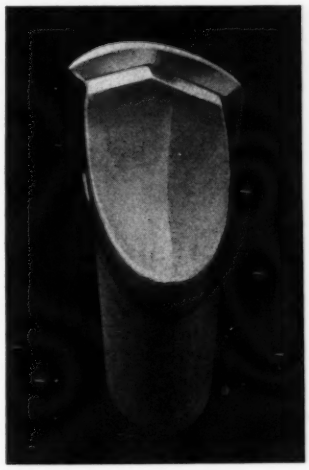

Fig. 5—Three-quarter veneer crown on lower cuspid (lingual view).

In Fig. 5 the V-shaped groove is fully shown across the incisal edge. The incisal groove is added to increase the retention, because often the cuspid does not present sufficient bulk and it is necessary to resort to the additional anchorage in the dentin.

Slice-Lock Preparation on Lower Incisor

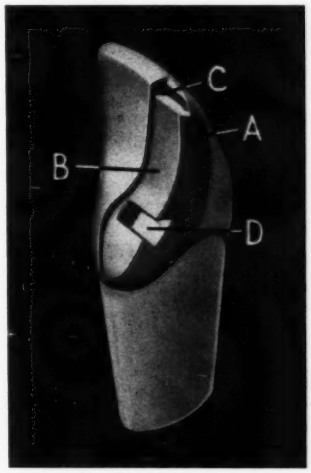

Fig. 6—Slice-lock preparation on lower incisor; A, proximal slice; B, lingual slice; C, incisal groove; D, dovetail lingual groove.

Preparations on the lower incisor teeth are comparatively limited because of the smallness of the teeth and the lack of sufficient tooth substance. There are many occasions, however, when some dependable form of preparation is needed as an auxiliary form of retention. This auxiliary form, whether it is for anteriors or posteriors, serves as one end of a piece of bridgework, principally for carrying some flexible or movable lock. Some lower incisors are too thin labio-lingually to allow the preparation of a groove of proper depth. In such cases, the groove in which to engage the abutment piece securely must be made in the bulkier portions of the tooth. Fig. 6 presents one of the forms of such a preparation.

1. A slice is made on the proximal surface indicated at *A*.

2. Half of the lingual surface is dressed down in a manner shown at *B*. This may be done with the use of a number 43 or 44 mounted wheel point.

3. The incisal edge is first beveled and then a V-groove is made with an inverted cone bur, as at *C*.

4. The dovetail groove at *D* is also made with an inverted cone bur and carried as far as shown in Fig. 6.

It should be understood that this preparation is indicated only when there is free access to the proximal surface and the tooth permits the impression to be taken in such a manner that its withdrawal will be in the proximal direction.

5. When this casting is completed, a suitable facet or preparation is made in the casting in its thickest portion. The counterpart, serving as the rest lug or flexible joint, is to rest in this facet. When the piece of bridgework is being set, this abutment is first cemented into place.

Slice-Lock Preparation on Upper Central

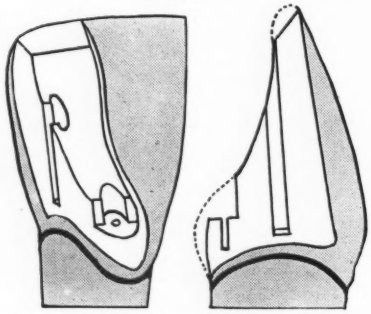

Fig. 6A—Slice-lock preparation on upper central. Anterior slice-lock preparation.

I have devised a preparation for the anteriors similar to Doctor K. W. Knapp's slice-lock preparation for a posterior.

1. For a proximal slice with reference to anterior teeth, the disc is held at an inclination of about 45° to the long axis of the tooth, and the angle converges toward the lingual. In this manner, the labial contour of the tooth is left intact.

2. Small, mounted, square-edged wheel stones are used to stone down the lingual surface. The extension is made half way across, mesio-distally.

3. The pinledge and channel are prepared on the linguo-cingular area.

4. On the sliced surface, midway bucco-lingually, an oval channel is cut in a line parallel to the pin channel. It is best to make both in line with the long axis.

The crosscut tapering or cone-square fissure burs are suggested for quick cutting. The channel is begun with a number 3 bur (Busch), sinking it into the dentin a little more than the bur's entire thickness. Then, with a similar number 1 bur inserted in the channel, cutting is done in a bucco-lingual direction in a small oval.

The use of crosscut burs on dentin leaves a finely serrated surface which must be made smooth. This is done by going over these surfaces in channels with the same size plain fissure burs of fine cut, or with the same size gold finishing burs.

This procedure is also described for posteriors (Fig. 30, second installment).

This preparation, which is comparatively new, requires a minimum amount of tooth-cutting, no display of gold, and has strong retention.

Pinledge on Upper Anterior

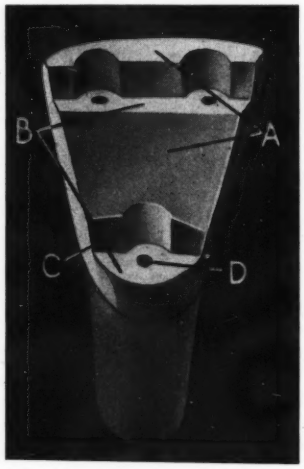

Fig. 7—Pinledge on upper central; A, reduction of proximal, lingual, and incisal surfaces; B, ledges cut across lingual surfaces; C, concave depression; D, pin channels.

For the pinledge, we are indebted to Doctor James Kendall Burgess. It has served for many years as an excellent means of anchorage. Although, in general, there has been slight change in its construction, still in the hands of each dentist it might take on slight modifications.

Early Form of Construction—Pure gold plate was burnished on the prepared tooth surface through which the pins had been forced through their channels. The gold plate was waxed securely with sticky wax, and an impression was taken with compound, the gold plate and the pins being removed. A model was poured of soldering investment material, and, when set, the compound was softened and removed; the entire piece was reinforced by melting 20 karat plate gold on it.

With the advent of the casting process, the procedure was changed. The preliminary steps for the preparation of the pinledge comprising the proximal, lingual, and incisal surfaces as indicated at *A* are similar to those described for the three-quarter crown. Changes which may be noted as varying from the so-called accepted form of the original pinledge preparation are due to the fact that I have endeavored to combine the best features of each of these preparations into one.

Modified Procedure—1. When the steps just described have been completed, two ledges are cut across the lingual surface as indicated at *B*. The first was cut one third the distance from the incisal edge and the second, two thirds the distance down. The depth of the ledge, lingual-labially, need be no more than 1 mm. and is made with a mounted, square-edged wheel stone, number 44.

2. With a number 29 cylinder mounted stone, the flat end resting on the edge, concave depressions are cut, as indicated at *C*, to a depth of 1 mm.

3. The pin channels, as indicated at *D*, are then made on the ledge, each one being centered in the cylindrical depression. These are cut with a number 3/0 bur (Busch) or a number ½ (S. S. White). These burs differ only in their numbering. The average depth should be 2 mm.

To prevent the possibility of coming in contact with the pulp, the bulk of the tooth should be well noted and the direction of the pins should be such that they will straddle the pulp and enter into areas of sound dentin. As a guide to determine a definite position for the pin channels, the lingual surface is mentally divided longitudinally in three. Then, by placing each channel in its respective position

in the center of each third, it will be found that encroachment on the pulp will not take place.

Impression Taking for Construction of Pinledge

Two methods may be described for the taking of an impression for the construction of a pinledge: the direct and the indirect-direct.

Direct Method—1. The three pins are cut as follows: (a) the length of wire (25 per cent gauge platinum iridium wire) is first annealed in the flame. (b) On the end of the beak of a Robinson plier, with the flat surface, the wire is laid across the entire width which will be found to be about 2 mm. (c) The opposing beak is closed over it and the wire bent over and cut. This will give the form of a little cane or hook. (d) Each pin is now inserted into its channel in the tooth which has been thoroughly lubricated with the saliva in the mouth. (e) A suitable matrix is employed to confine the casting wax which is to be applied. (f) The wax mass is removed intact with the pins and carved down until it assumes the required form. (g) It is carefully placed back on the tooth, being cautious to have each pin go to position; (h) the final carving and marginal adaptation are completed.

2. It is also possible in the direct method to eliminate the matrix, flowing the casting wax directly onto the tooth by using suitable carriers. In this manner an open or clear view of the tooth and its preparation is maintained and too much surplus material is avoided. When suitably carved to form, the marginal and surface adaptation are obtained with linen, silk, or rubber dam strips. When the pattern is removed, it is then put through the process of investing and casting.

3. There are some who will advocate taking an impression in compound when the pins are placed in position and then pouring the impression in casting investment material. When the investment has thoroughly set and the compound has been removed, wax is flowed over the pins and preparation on this investment model. The pattern is then invested and cast.

The danger of this step is the possible flaking or accidental cutting or scraping of corners or surfaces of the investment material model during the process of separating the model from the compound, or while waxing and carving.

Indirect-Direct Method — While any one of the direct methods may be found expedient in the hands of those who favor them, in my opinion, the indirect-direct method will be found of greater universal application, especially in the hands of the average dentist. This method requires only an additional sitting for the trying in and adapting of the wax pattern.

At the first sitting, the preparation is made and a compound impression taken. In the interim between sittings, an amalgam or Kryptex model or die is made upon which the wax pattern is made at the following visit of the patient. This procedure has been specifically outlined in the description for a three-quarter veneer crown on an upper central (Fig. 1).

Method of Making a Die

To make a die in which pins are involved, it is difficult to have the pins readily or easily removable and to prevent their being affected by the amalgam. After considerable experimentation, I have devised the following method:

1. Each pin in the impression is covered with a tiny sleeve that is slipped over it. This sleeve is of a tubing used in the making of hypodermic needles and is now readily obtainable in foot lengths and of a caliber to fit pin wire of standard gauge.

2. With a knife-edged file, short lengths of about 3 mm. are nicked, and broken or snapped off.

3. Each sleeve is fitted over each pin in the compound impression, and a tiny bead of wax is dropped onto each open end.

4. The amalgam is packed with the first layer in a plastic condition, without too much jarring or pressure against the pins or tubes, followed by denser masses from which the greater part of the mercury has been expressed.

5. When the amalgam is set and the compound softened or removed, the pins will be found to go in and out easily.

6. When the pattern is about to be made, the pins are removed, and the entire die is oiled or lubricated, preferably with a Bristol brush dipped in castor oil. Castor oil is suggested because it does not dry up and it prevents the wax from sticking to the die.

7. The pins are then replaced into their channels, and casting wax is either melted on or softened and pressed to place.

8. The pattern when completed is removed and brought to position on the tooth in the mouth.

9. From this point on, it is treated as a direct pattern, all adjustments and adaptations being made before it is removed and a sprue is attached for investing and casting. The pattern is not replaced on the die once it is fitted satisfactorily in the mouth.

Registering of the bite during the wax pattern stage of veneers of hoods is not mentioned or suggested because it is infinitely safer or more practical to do so in the finished casting, articulating paper and small stones being used. Sufficient clearance should be made during preparation to require little adjustment.

Pinledge

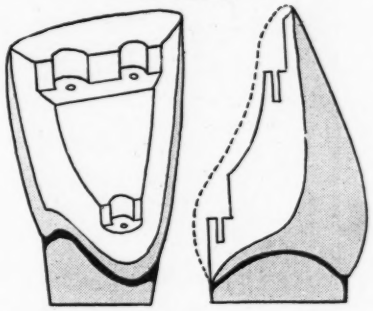

Fig. 7A—Diagrammatic representation of pinledge preparation.

Pin Veneer on Upper Cuspid

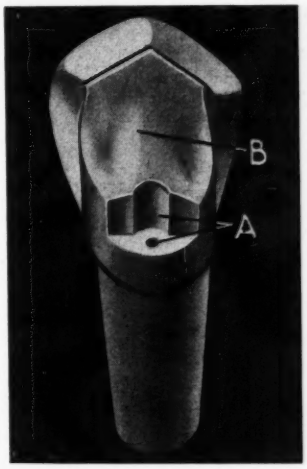

Fig. 8—Pin veneer on upper cuspid; A, pinledge feature; B, open lingual area.

Preparation of a pin veneer on an upper cuspid is a combination of the three-quarter veneer crown and the pinledge; the pinledge feature is indicated at *A* in Fig. 8. The pinledge is incorporated in such instances in which the tooth is quite thin at the incisal half and the bite is close so that little preparation, if any, can be done at that portion of the tooth. Retention is dependent upon the proximal grooves, and the pin, on the linguo-cingular area. In some instances it may not even be possible to have sufficiently deep proximal grooves; it is then necessary to add a shallow V-groove on the incisal edge, and the resultant casting will be open on the lingual area, indicated at *B*, because of the close-bite. In an extreme case

of close-bite, the resultant casting will be U-shaped, taking in the two proximal grooves and the linguo-cingular preparation, and leaving almost the entire lingual and incisal surfaces free.

Disto-Incisal Pinlay Preparation on Lower Cuspid

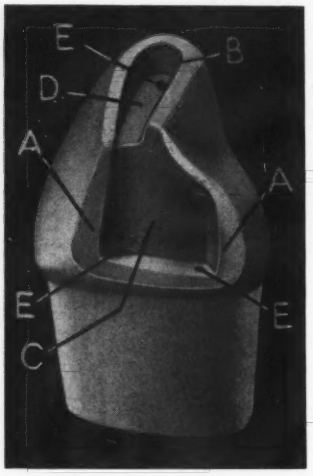

Fig. 9—Distal incisal pinledge preparation on lower cuspid; A, distal slice extended to gingival; B, beveled incisal edge; C, proximal step; D, incisal extension of step; E, pin channels.

The following preparation is suggested and indicated in conditions in which the area beyond the cuspid is edentulous when no clasp is desired on the cuspid and some precision attachment is to be used as the medium of retention:

1. With the carborundum disc, a slice or apron is made on the distal surface down to the gingival border, as indicated at *A*, Fig. 9.

2. With a suitable stone, the incisal edge is beveled toward the lingual, presenting a flat surface in a manner as indicated at *B*, Fig. 9.

3. On the distal there is prepared a step (Fig. 9, *C*) of sufficient depth to accommodate the size of the attachment selected.

4. It must be remembered that a cuspid, even though comparatively large, does not offer much in the way of retention, especially when forces are applied. To increase this required retention, anchoring well in the dentin is important, and is best done by the preparation of three pin channels (Fig. 9, *E*).

The channels are made with the same size bur and in the same manner as in Fig. 7, and the preparation is likewise obtained as in Fig. 7.

This preparation need not be limited to the recommendations given here but may be found useful in many other applications whether they are fixed or removable restorations.

Pinledge on Upper Anterior

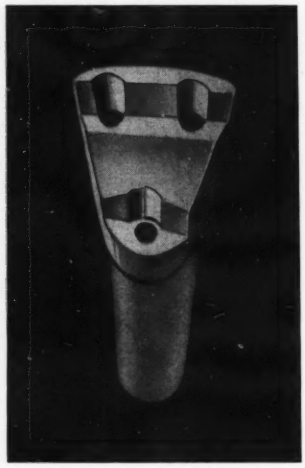

Fig. 10—Pinledge in upper anterior.

The preparation for a pitledge on an upper anterior is of recent offering and represents a slight variation of the pinledge in that it eliminates the use of the pins.

1. All cutting, slicing, and stoning is done in the same manner as for the pinledge.

2. The pit is made with a number 3 round bur, sinking it to the depth of 1 to 2½ mm.

3. This is followed by a number 3 cylinder square fissure bur to put a finished character to the channel.

Pitledge

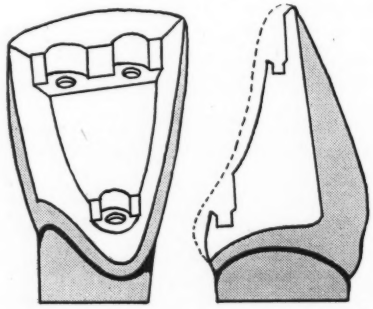

Fig. 10A—Pitledge. Modification of pinledge with shallow pits instead of pin channels.

4. As a final step the pit is flared with a number 5 round bur, and the rim is beveled.

In the casting this broader and shallower channel or pit is represented by a small stumpy post or plug that fits into the pit. A comparison of the pits with the channels of a pinledge will show the difference in size.

Pin Veneer Preparation on Lower Incisor

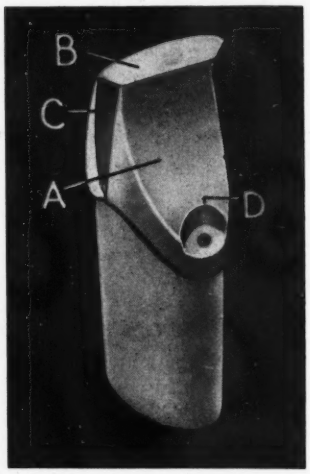

Fig. 11—Pin veneer preparation on lower incisor; A, slight reduction on lingual surface; B, incisal edge beveled; C, proximal groove; D, pin channel.

As has been stated previously, there is little choice in the selection of a preparation for any of the lower incisor teeth to be used as abutments. But when the emergency does arise, one should be ready for it. A comparison of Fig. 8 with Fig. 11 will show that the two preparations are similar and are prepared in like manner. Very little need be removed from the lingual surface *A* because of freedom from articulation. The incisal edge *B* is beveled lingually, and proximal grooves are made (*C*). The pin channel at the thickest portion of the tooth is indicated at *D*.

This preparation has been used on both lateral incisors in constructing a bridge to restore the two central incisors.

Two-Pin Pinledge on Lower Incisor

Fig. 12—Two-pin pinledge preparation on lower incisor.

The steps in the preparation for a two-pin pinledge are similar to those employed for the pinledge (Fig. 7). This is another preparation that is serviceable in a lower incisor.

ANOTHER PIN VENEER FORM ON LOWER INCISOR

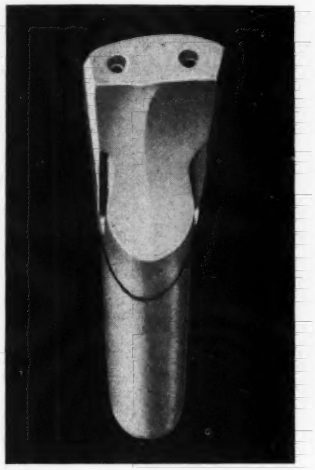

Fig. 13—Pin veneer form on lower incisor.

There are certain types of lower incisors that show excessive abrasion on the incisal edges; they appear stumpy and still offer little retention for proximal groove preparations. For such types, the following preparation is suggested:

Two pin channels (25 gauge) are prepared in position (Fig. 13) on the beveled incisal edge, and countersunk to afford firm anchorage for the pin in the gold. In the thickest portion of the tooth, which would be the linguo-gingival mass, two short grooves are made with a mounted point, number 27, sinking the stone into the tooth substance only half its diameter.

(*End of First Installment*)

A NEW USE FOR A SHOEMAKER'S KNIFE

Doctor Louis M. Daum, Los Angeles, suggests that a shoemaker's knife is a useful laboratory instrument. The blades are interchangeable, strong, keen, and pointed. They are just right for carving in the Roach Technique. The knife makes the trimming of those forgotten models a pleasure.

HELPFUL HINTS FOR A DENTAL OFFICE*

SUE R. MILLER, D.H.
Minneapolis

1. If a few drops of eugenol or oil of cloves are put in the air syringe, it will have a pleasant odor.

2. A good solution for washing a wax model before investing is made with one part of liquid soap and three parts hydrogen peroxide.

3. A 10 per cent solution of hydrochloric acid will readily remove mouth wash stains from glasses.

4. A solution of water and sodium bicarbonate will neutralize acid on gold.

5. Pumice mixed with a tooth paste, a few drops of pure glycerine and water should be kept in a glass container (mustard dish) so it will always be ready for use. A solution of borax for soldering should also be kept handy in the same kind of glass container.

6. Chloroform may be used to remove compound from trays, wax and tar from rubber mats on chairs, and to clean the inside of the sterilizer.

7. To remove silver nitrate from the hands, the stains should be covered with iodin and then rubbed with ammonia.

Ammonia may also be used to clean white enamel stools and cabinets.

8. Pipe stem cleaners should be used to wipe out dirty oil from the handpiece. The contra-angle should be run in sterile Super-Service oil, which is slightly scented, to keep in good condition with a pleasant odor.

9. Talcum powder rubbed on a thoroughly dried plaster cast will give it a gloss.

10. To keep a steel needle for a Cook syringe from rusting, a carpule should be filled with sterile vaseline; the vaseline is run through the needle and a cotton roll placed over the needle. Before it is used again, the needle should be boiled for ten minutes in an evaporating dish.

11. Powder puffs may be made from cotton rolls, and a hand lotion may be made of one part pure glycerine and two parts spirits of camphor.

*Second prize winner among Dental Assistants' Clinics given at Memphis, October, 1931.

LETTERS

I want to add my personal tribute to the already large number of letters of congratulation which you have received.

From the standpoint of educational material and typographical perfection, I think your publication is an outstanding addition to the already large number of dental publications. If you continue along this line, I see no reason why THE DENTAL DIGEST should not be the most popular of all dental magazines. The material is concise, snappy and wonderfully well illustrated.

Please accept my personal congratulations and best wishes for its future success. —WALTER E. MENDEL, D.D.S., *Pittsburgh*

I find the reading material in THE DENTAL DIGEST very interesting and far superior to any other dental material that I have in my office.—C. M. HINKLEY, D.D.S., *Ridgway, Ill.*

I missed the first copy of the new DENTAL DIGEST and I am sure that I have missed something worth while. You are truly to be congratulated. The new DIGEST is the best dental journal I have ever seen. —GEORGE N. SUNDQUIST, D.D.S., *Superior, Wis.*

May I venture to compliment you on the attractive appearance of your magazine and the very interesting content?—METTA LOOMIS, Librarian, University of Illinois, College of Medicine and Dentistry, *Chicago*

The second issue of THE DENTAL DIGEST came and the manner in which it excels the first issue—a tough job—is astounding. —JOHN J. JAFFIN, D.D.S., *New York*

The new issue of THE DENTAL DIGEST is the best of the six publications which I take.—R. M. VAN DUZER, D.D.S., *Bartlesville, Okla.*

I commend you on the appearance of the new DENTAL DIGEST.—LEO LISS, D.D.S., *Orange, N. J.*

REMOVING AMALGAM CARVINGS

C. FRANK TUMA, D.D.S.
Cleveland

PARTICLES of amalgam which patients find difficult to empty from their mouths can be neatly removed from under the tongue or from between the cheek and gum with one sweep of a cotton swatch.

Some absorbent cotton, the size of a hickory nut, is picked up with pliers, the mass is left unpacked, and each area is swept clean.

The loose fibers ensnare the small particles.

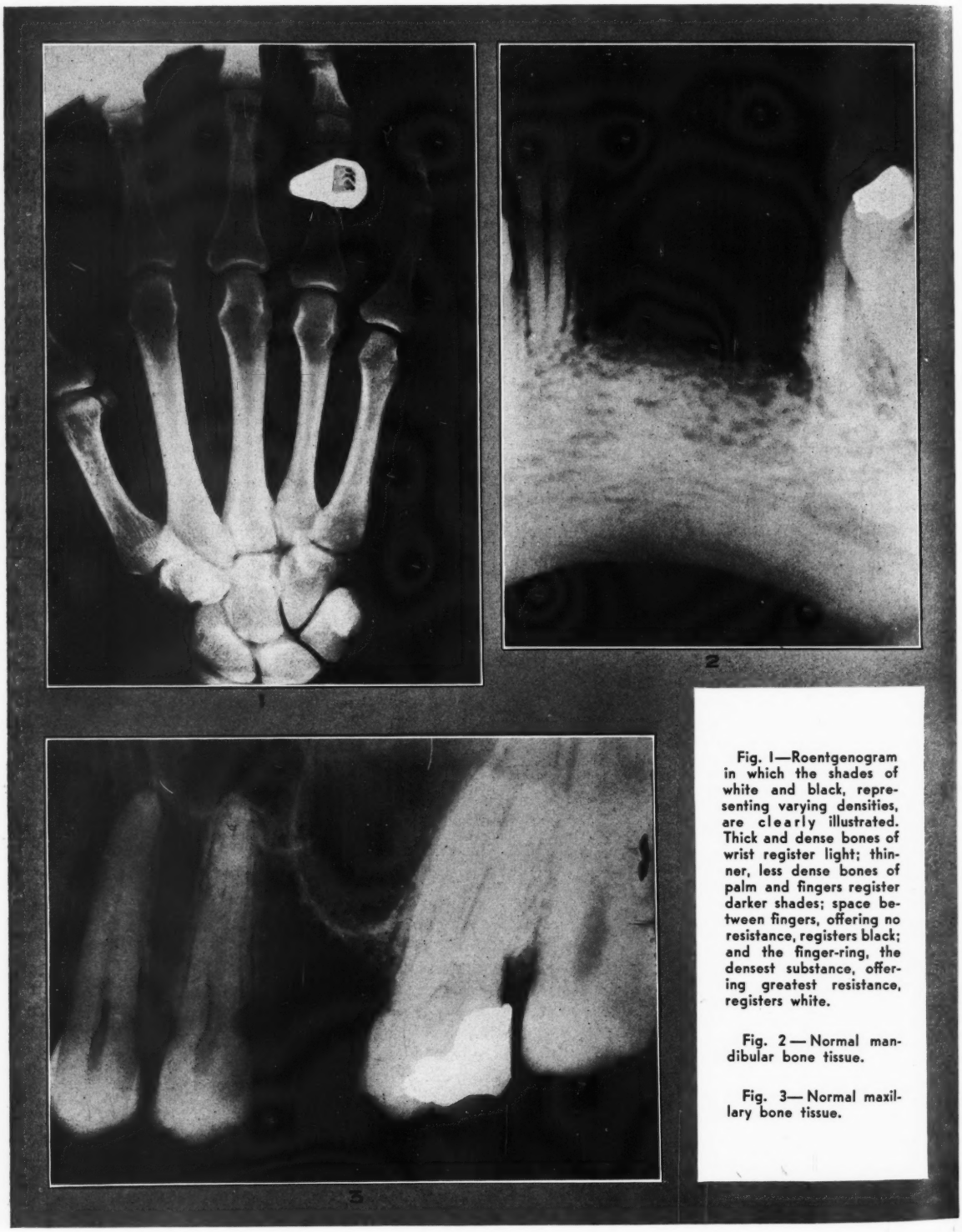

Fig. 1—Roentgenogram in which the shades of white and black, representing varying densities, are clearly illustrated. Thick and dense bones of wrist register light; thinner, less dense bones of palm and fingers register darker shades; space between fingers, offering no resistance, registers black; and the finger-ring, the densest substance, offering greatest resistance, registers white.

Fig. 2—Normal mandibular bone tissue.

Fig. 3—Normal maxillary bone tissue.

OF OSTEITIS FROM CYSTS

RUSSELL O. L. SMITH, D.D.S.
Buffalo, New York

BEFORE a differential diagnosis of dental pathologic conditions can be made there are elementary facts regarding the roentgen ray and the roentgenogram which must be thoroughly understood.

What is the roentgen ray?

The roentgen ray is the tri-ultraviolet ray possessing penetrative and chemically active properties activating the emulsion of photographic films or plates necessary to produce a roentgenogram.

What is a roentgenogram?

A roentgenogram is a visual reading of the varying densities of all objects the roentgen ray penetrates in its path to the film. On it is registered in white and black, and their intermediate shades, the varying densities of the objects. The denser the object, the lighter is the resultant area on the film; the less dense the object, the darker is the resultant area on the film.

The varying shades become known as contrast; the study of the varying shades is known as interpretation. The recognition of normal or abnormal shades becomes known as diagnosis.

The knowledge of these facts, together with the knowledge of the normal appearance of maxillary and mandibular bone tissue, is a positive requisite for making a correct dental roentgenographic differential diagnosis.

Rarefying Osteitis

Osteitis of the rarefying or suppurative type is a destructive involvement of bone tissue, recognized in the roentgenogram by the replacement of the characteristic appearance of normal bone tissue with the darkened area which indicates the result of infection.

Cysts

Cysts are a destructive infection of bone tissue in which the area of degeneration is circumscribed by a membranous wall of tough, fibrous texture. They are of two classes, those involving soft tissue and those involving bone tissue. The two divisions are further classified into many types. The type referred to in this article

Fig. 4—Rarefying osteitis in lower anterior region.

Fig. 5—Cyst on roots of upper second molar, evidenced by a definite outline in black, sharply surrounded by the light shade of normal bone tissue.

is the radicular cyst commonly occurring in the maxilla and mandible.

The presence of cysts is registered on the roentgenogram in black since the denser bone structure is replaced by less dense degenerated tissue which offers practically no resistance to the penetrative roentgen ray.

The important differentiating factors are:

1. In rarefying osteitis the black, at the point of origin of infection, gradually "bleaches" into the lighter shades until it is ultimately diffused into the shade of normal bone tissue.
2. When a cystic formation is present the disintegrated area is represented on the roentgenogram in a definite outline.
3. A sharp contrast between the normal and abnormal shades is evidenced by a definite line of demarcation.

It is important to recognize the facts that the roentgenogram truly manifests. Successful operative procedure almost entirely depends upon correct diagnosis. If, for instance, the first molar, as shown in Fig. 6, were to be hastily removed without roentgenologic knowledge of the underlying pathologic condition, it would be possible to permit the walled-off area of disintegration to remain.

Cysts of the type represented in Fig. 6 begin in the interior of the bone. They can be recognized in their early stages, or, by neglect, they may increase in size until only a shell of bone covers them (Fig. 7). While in general benign, they may infiltrate the maxillary bone, inducing osteomyelitis or atrophy, or they may even become sarcomatous.

Care must be exercised in the operative procedure for removing a tooth to which a cyst appears to be attached. The tooth should be loosened from its bony socket, allowing the tooth to act as one attachment of the cyst, thus (1) facilitating the removal of the remaining portion of the cyst, (2) removing it in its entirety, and (3) avoiding the possibility of residual infection.

Conclusion

Because of the roentgenologic factors for differentiating between rarefying osteitis and cysts which have been established here, it may be concluded that it is of paramount importance for the dentist to possess the roentgenologic knowledge of dental conditions he is called upon to treat; that it is not only his moral duty to acquire this knowledge, but it is an essential requisite for the successful practice of skill and training in dentistry.

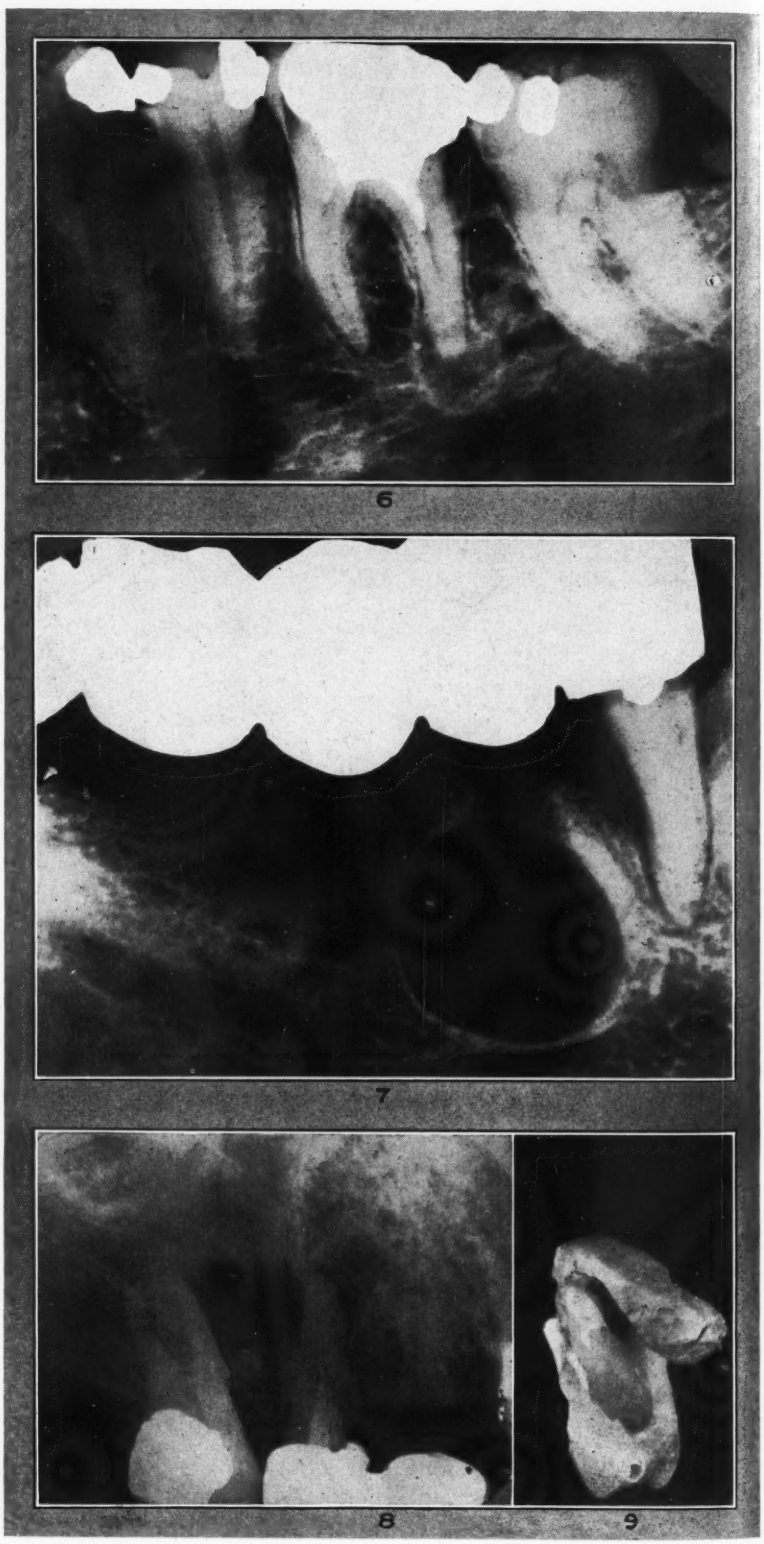

Fig. 6—Roentgenogram showing a cyst at apical region of distal root of first molar.
Fig. 7—Roentgenogram illustrating the outcome of failure to remove encapsulated infected tissue in its entirety at the time of removal of the infected tooth.
Fig. 8—Roentgenogram showing cyst extending from first molar beyond root of second bicuspid.
Fig. 9—Photograph of molar shown in Fig. 8, with cyst (smaller in size because of shrinkage and time elapsing before photographing) attached.

PROFILE ROENTGENOGRAMS

F. J. MARTIN, D.D.S.
Medford, Wisconsin

PROSTHETIC dentistry lays great stress on articulation, occlusion, facial contour, and expression; therefore, profile roentgenograms should be of inestimable value, not only in prosthetic dentistry but in orthodontia and restorative work as well.

Many patients, after dentures have been inserted, are of the opinion that they cause their chins to be higher or lower; that formerly their lips did not protrude or recede so much, and otherwise criticize the dentist's effort. This attitude can be refuted by referring to the profile roentgenogram which should convince the patient of his or her erroneous impression.

In orthodontic cases the operator can show the patient the progress that has been made and the changes that are being brought about as the work advances. This is especially true in cases of marked protrusion, and in restorative work in adults in whom bone surgery or surgical removal is necessary and a great deal of the alveolus has to be removed. Figs. 3 and 4 show a case in which this was done. In this case excess bone was removed along the labial, and enough taken away on the palate so that the lower teeth, after having been ground down somewhat, do not strike the palatal tissue, as shown in Fig. 4. In the performance of the surgical alveolectomy of the four upper anteriors, the profile roentgenogram taken before extraction was of great help because it was used as a guide to show how much bone could be removed without distorting the profile.

Technique for Obtaining Profile Roentgenograms

It is well known that upon leaving the tube, the rays diverge, and that the farther one can get away and still be within the active power of the roentgen ray, the more parallel the rays will be and the more accurate the profile.

A series of twenty-seven roentgenograms was taken with the head tipped in almost every position possible. A double intensifying screen with the distance ranging from 2 to 12 feet was used. It was then found that, with this particular tube, the most accurate, consistent profiles could be obtained by having the patient 10 feet away and an exposure of one second. This is the distance and exposure I have used over a period of three years. There may be some variation in distance with other tubes, but this can easily be determined by the operator.

The film is placed in the casette, and then put in the casette holder shown in Fig. 1. The holder consists of an adjustable shelf with a cleat for holding the casette and is mounted on two vertical rods attached to the wall or frame. This shelf is curved so that the profile of the patient may be parallel to the casette and as near as possible to it. The shelf can then be lowered to the required height. The film generally used is 8 by 10, safety ultraspeed. The casette holder was made to hold the film in the same position, regardless of the movements of the patient. There are many ways of holding the casette in place which can be used to suit the individual operator. The one-second exposure was decided on here so that the movement of the patient was reduced to a minimum. If it is desired to show more detail of the bite or alveolus, the exposure can be longer, but the patient must be cautioned not to move.

Fig. 1—Casette holder.

The point of focus used is the tip of the nose. The x-ray apparatus is placed at the proper distance from the patient. Then the tube is lowered to the same height as the point of focus. This is done with a measuring stick. The operator then sights along the tube until it is in direct line with that point.

The profile outlined is accentuated by applying a thin line of barium paste prior to the exposure, as shown in Fig. 2. This is done with a quantity of barium meal mixed with water to such a consistency that it will not run when applied with a camel's hair brush. The barium line extends from the top of the forehead to a point below the thyroid notch. The barium paste is also valuable in longer exposures when details of the bite and bone are being obtained, as it outlines the profile perfectly.

The patient's head is then placed with the median line parallel to the casette, the exposure is made, and the film is developed. A print is made of this film, and it is pasted on a stiff piece of cardboard. The profile outline is then cut out with a thin-bladed pointed knife, following the inside line made by the barium paste. This gives the profile or template, as shown in Fig. 5.

If, before extraction, the bite seems to be worn down or closed because of some abnormality, a block of the desired thickness can be placed between the teeth before the profile roentgenogram is taken.

Conclusion

It is my contention that every exodontist, oral surgeon, or general practitioner who extracts teeth and prepares the mouth surgically for dentures should first make a profile roentgenogram. If the case is a referred one, and the profile roentgenogram is returned to the dentist as a guide, the operator doing the extracting could rest assured that thereafter this dentist would refer all his work to him.

(Turn to next page)

FIG. 2

FIG. 3

FIG. 4

FIG. 5

Fig. 2—Line of barium paste accentuating profile outline.

Fig. 3—Note marked protrusion of upper six anterior teeth. Lower six articulate with and penetrate the palate to a depth of one-eighth inch, causing a great deal of irritation to soft tissues of palate.

Fig. 4—Roentgenogram taken after alveolectomy of the four upper anterior teeth, with prosthetic appliance in position.

Fig. 5—Appearance of profile or template after it is cut out along the inside line made with the barium paste.

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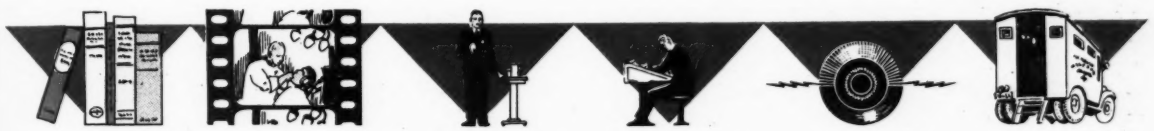

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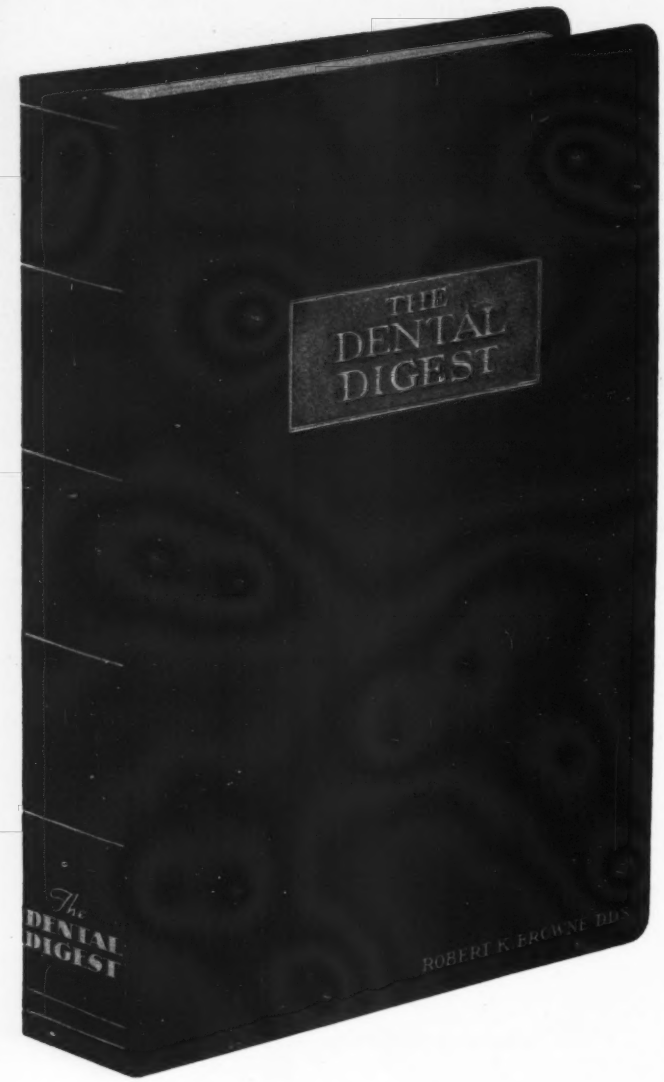

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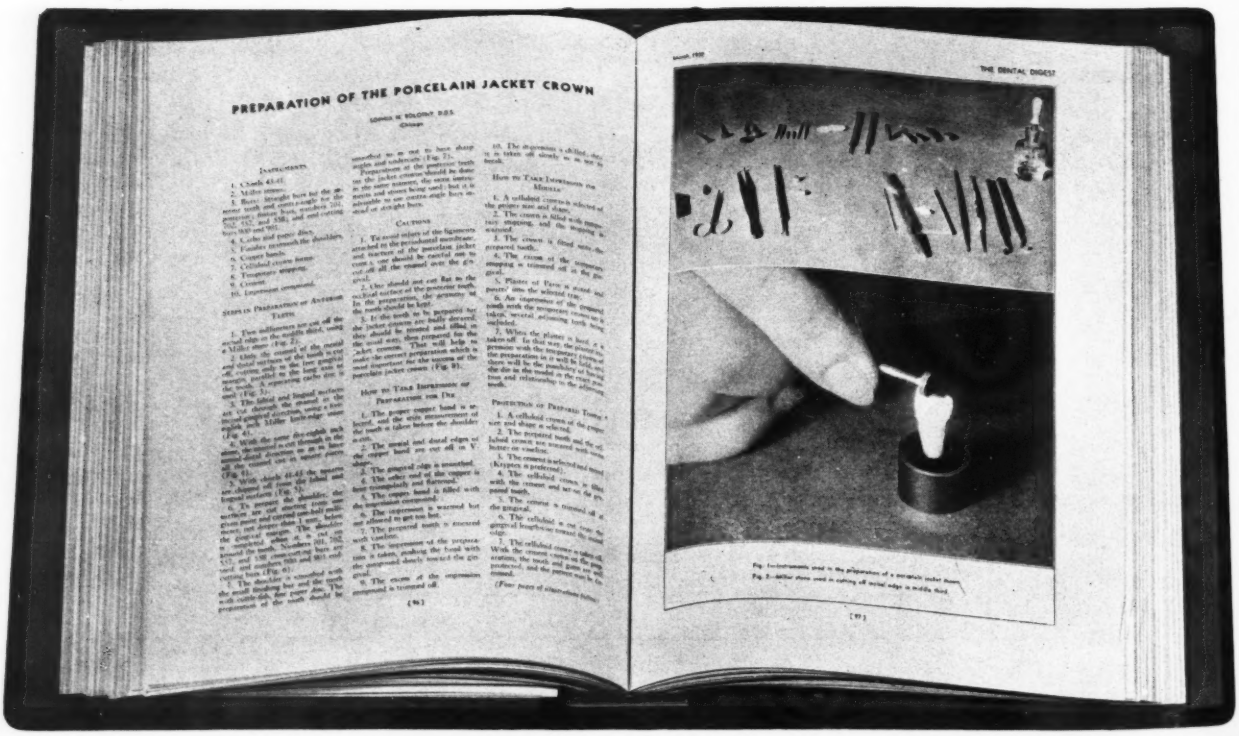
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Address all communications to Elsie Grey, in care of THE DENTAL DIGEST, 1125 *Wolfendale Street, Pittsburgh, Pa.*

QUESTION—What can the assistant do when a patient faints? I am new in the field of dental assisting and wish to become efficient in this phase of the service. How can I help the patient quickly and well?

ANSWER—Fainting is *unconsciousness*. Unconsciousness is a lack of sensibility; the person who becomes unconscious becomes insensible, or, in other words, knows nothing of his surroundings. There are varying degrees of this condition. Similar causes may bring about unconsciousness varying, according to the intensity of the cause, from a partial state, from which a patient may recover quickly, to a total state, which may prove fatal.

Unconsciousness may result from a variety of causes, and in order to aid the patient properly, one should try to ascertain the particular cause by taking the surroundings into consideration as well as by a careful examination of the patient. Some of the causes of unconsciousness are (1) shock, (2) sunstroke or heatstroke, (3) bleeding, (4) gas poisoning, (5) apoplexy, (6) electric shock, (7) heat exhaustion, (8) poisons, (9) brain injuries. These particular causes are mentioned as they are among the most common.

It may be that one may not be able definitely to ascertain the cause of the patient's unconsciousness, in which case, it is best not to experiment but to summon a physician immediately. A physician should be summoned likewise if the patient does not immediately respond to the first aid administered in those cases in which the cause has been definitely determined.

There are two types of diagnostic symptoms to be observed in persons who have lost consciousness: either (1) paleness and weakness; or (2) a red face and strong pulse. The patient who is pale and weak should be placed in a reclining position with the head placed low; the patient should be kept warm and stimulated. The patient whose face is red and whose pulse is very strong should have his head raised, and no stimulation should be given. Cold applications to the face and chest will help.

Fainting is probably the most common form of unconsciousness, and the most prevalent in dental patients. Excessive nervousness, fear, pain, medicament odors, the sight of blood, instruments, or anatomic specimens, illness—any of these may be the cause of fainting. The patient faints because there is a lack of blood supply to the brain; he loses his normal coloring; he becomes pale in increasing degrees; a cold perspiration may accompany the condition; the pupils become dilated; breathing is shallow or marked by sighing; the pulse is weak and rapid.

At the first sign of pallor, the patient should be made to bend over with the head between the knees. This will often immediately restore circulation and prevent a complete unconsciousness; however, if this does not help at once, this treatment should not be continued. The patient should lie with the head lower than the body. This is quickly done in a dental chair by pressing the lever that tilts the chair back. The clothing should be loosened and the window opened. The face may be sprinkled with cold water; smelling salts or spirits of ammonia may be placed to the nostrils, and the wrists and forearms rubbed upward. When able to swallow, a stimulant should be given, but the patient should not be allowed to sit up until fully recovered.

Shock is often designated as "collapse" or "prostration" and is usually the result of an injury. Shock causes a more serious form of unconsciousness than fainting. Sometimes, it follows operative work in a dental office and should be treated accordingly. A physician should be sent for at once. In cases of shock there is a stagnation of the blood somewhere in the body and the whole system suffers because there is an interrupted circulation. The patient is pale; the finger tips and lips are bluish; there is cold perspiration on the brow; the eyes are staring; the pupils, dilated; the pulse is rapid; the blood pressure, low, and breathing, shallow. There may be nausea and vomiting followed by hiccups. The limbs are heavy and limp when raised.

The patient should be placed flat on the back with the head low and feet high. Hot water bottles or covers should be used to keep the patient warm. Aromatic spirits of ammonia, half a teaspoonful to a half glass of water, and a hot drink should be given. Smelling salts or ammonia may be used for inhaling from time to time. If the shock is the result of an injury with severe bleeding, of course, everything should be done to stop the bleeding first.

Bleeding is of several types: arterial, venous, and capillary. Arterial bleeding is the most serious. It is distinguished by its bright red color and "spurting" action. Venous bleeding is a dark, purplish red in color, and is of a continuous flow. The capillaries are really small blood vessels that form a delicate network in the body and give it a rosy tint. These bleed from slight cuts, scratches, or pricks, and the blood oozes in a darkish red color. In arterial bleeding, pressure should be applied at the points between the cuts and the heart, or on the bleeding spot itself. In venous bleeding, the pressure should be made on the side of the cuts away from the heart.

QUESTION—When a new patient comes in who has never seen the dentist before, is it proper for the assistant, after having found out the patient's name, to introduce the patient to the dentist?

ANSWER—The assistant has been aptly termed "hostess" of the dental office. This not only applies to her care and supervision of the office with regard to its cleanliness and appearance, but also because she receives all persons who come to the office. It is perfectly in order, therefore, that she should, in the case of a new patient, say to the dentist, "Doctor Blank, this is Mrs. White who has been referred to you by Mrs. Black; or, "Doctor Blank, this is Mrs. White who has her first appointment with you this morning." In the case of children, it establishes a friendly attitude if the assistant says, "Doctor Blank, this is Bobbie Smith. Bobbie is Dorothy's big brother," or some other brief statement of the kind. This makes Bobbie feel that he is quite important and that he is being treated as a "real fellow."

LETTERS

The new DENTAL DIGEST is by far the best arranged and best printed dental magazine. Add my compliments to the many you have no doubt received. The character of your advertising, too, shows discrimination. Keep your good work up! —ARTHUR L. ROBERTS, D.D.S., *Aurora, Ill.*

Allow me to congratulate you on the new and wonderful DENTAL DIGEST.

To me it is the best of all the dental journals that come to my desk during the month and the one I shall look forward to very eagerly as the first of the month rolls around.

The visual education of the dentist is as important as the visual education of the patient, if not more so, and the DENTAL DIGEST certainly carries out this idea most strikingly.—PHILIP E. ZEISS, D.D.S., *Burbank, Calif.*

I have just finished reading the second issue of your new magazine. I was so taken with the first issue that I had to show it to everyone I met whether he was of the dental profession or not. I like the second issue even better than the first. It is a publication you should be proud to issue and one which the whole profession should be honored to receive.

The magazine is a triumph of editorial effort and typography. There can be no doubt that your magazine will do much to increase the general dentist's pride in his profession as well as raise the profession in the estimation of the public. It is a bright and encouraging interlude in our scheme of life which has been interposed at just the time when it was most needed.—CHARLES M. WOODWARD, D.D.S., *Pasadena, Calif.*

The new DENTAL DIGEST has no precedent in dental literature.—FERNANDO SARTI, D.D.S., *Guatemala, C. A.*

I have received the DIGEST in its new form and feel that you have hit the nail on the head. — FRED L. JENKINS, D.D.S., *Villisca, Iowa*

I wish to compliment you on your new journal. For a new publication there isn't much about it one could criticize. I welcome it.—O. J. RAFFETY, D.D.S., *Chicago*

This is the finest magazine of its kind in the field. The article on "A Mechanism of Bacterial Infection" in the February number has already paid me for ten years' subscriptions. Success will be yours.—ERNEST BAKER, D.D.S., *Berkeley, Calif.*

May I add my little bit and congratulate you on the originality of the new DENTAL DIGEST? It takes idealism and also practicability—a rare combination—to produce a magazine like this.

As the dental profession is rapidly advancing it is good that you took the initiative and did something away ahead of the field in this respect.—GEORGE E. COX, D.D.S., *Wilmington, Del.*

I congratulate you upon your new and splendid publication, THE DENTAL DIGEST. It is a refreshing departure from the general type of dental publication. The illustrations and color work are excellent and it may be gratifying to you to know that at a recent dental committee meeting in Boston your magazine called forth a great deal of complimentary comment.—JOHN J. FITZ-GIBBON, D.D.S., *Holyoke, Mass.*

For many years we have known Dr. George Wood Clapp and have been subscribers to the majority of dental publications. As subscribers to the new DIGEST, we wish to compliment you on this first number. The articles are interesting, the very clear illustrations an improvement on all others, and the make-up of the magazine very attractive. This new departure in dental literature should have an interesting and useful career.—F. ROUS MALLORY and ALAN C. MCLEOD, *London, Eng.*

The cover is striking, pleasing, and, at the same time, modest. The color combination is very attractive. The illustrations in your principal article impressed me at the beginning as somewhat startling and profuse, but the more I look at them, the more I realize the virtue of their clearness, outline, and sequence. Under no circumstances would I wish to have them changed.

The more I go through the issue, the better I like it, both as to form and contents; and I earnestly hope you will adhere to the plan which this number indicates.—OSCAR FARKASCH, D.D.S., *New York*

Your 1932 model DENTAL DIGEST is, without doubt, the most common sense and most instructive magazine for dentists that I have ever seen, and I have read them all.

The article, "Showing the Patient," has more educational qualities for both dentist and patient than anything one could wish for; in fact, all the articles in the issue are just as clear, and it is not necessary to pore over column after column of reading matter.

Allow me to congratulate you on such a fine publication. Also, it will sell more dentistry than anything ever published, and it will educate dentists more quickly than anything ever before published. — RALPH A. CASE, D.D.S., *Vallejo, Calif.*

The new DENTAL DIGEST is beautiful, and the printing and the photographs are excellently done.

Then, too, it is practical: all articles and papers to date are instructive and written intelligently, making the reading of them a pleasure rather than work.

In dignity and clarity it surpasses all dental magazines which have gone before it, and it is one which is worth saving for posterity. Therefore, I believe you should have made a leather cover in which the twelve issues of the year may be kept, so that the copies may stay as beautiful as they are when we receive them. I believe all your subscribers would gladly purchase binders. — WILLIAM C. MOGK, D.D.S., *Brooklyn, N. Y.*

Let me congratulate you on your new venture in dental journalism. I can foresee the many hardships in your path that will make it difficult for you to carry out your plans along the lines you have established, but I have full confidence that the profession will support you.

The idea behind the new DENTAL DIGEST is indeed revolutionary, for the *visualization of applied dentistry* has never been attempted before as an objective of a dental publication.

The potentialities of the field are great: such a magazine will bring to a common focus all *technical* dentistry in the domain of *medical, surgical,* and *reconstructive* oral therapy before the profession for verification in terms of *fundamentals* of oral science and diagnostics. Carried to its logical conclusion, it will mark the beginning of the end of empiricism in our specialty. After stripping technique of verbiage and presenting it in its naked simplicity for application, it should be easy for the profession to acquire in a very short time a sense of discrimination and selection of the scientific from the pseudo-scientific. It will also put the "original" minds and the discoverers of methods, procedures, principles, etc., on their guard.

Seeing your aim in the light I do, I can only wish you the best of luck in serving dentistry the best way you see how. Good luck to you. — ALFRED J. ASGIS, D.D.S., *New York*

I have just received my DENTAL DIGEST. As an old printer, as well as a dentist, I want to tell you that I think it the best looking magazine in the dental world. You should be proud of your x-ray halftones as they are the best that have been published in any magazine that I have seen. The color work speaks for itself.—W. S. COLBURN, D.D.S., *San Francisco*

It seems almost too good to be true that a dental magazine can be put up so attractively. I am sure that you are doing much more for the profession than you realize, more than the dentists themselves will realize for some time to come.

There is only one criticism, and that is the size. Having had all our journals bound each year for a number of years past, and since all are so uniform, the new size will disrupt our library shelf arrangement.—B. L. HOOPER, D.D.S., *Lincoln, Neb.*

Let me congratulate you on the very fine issues of THE DENTAL DIGEST which I have received since the first of the year. I feel that this journal is a distinct contribution to dental literature and I extend my best wishes for a prosperous career under its new leadership. — STANLEY D. TYLMAN, D.D.S., *Chicago*

Allow me to congratulate you on the general improvement in your journal. Both the colored and the black and white illustrations are fine. I have been interested in several articles which have appeared in its pages. I have read the story of "The Cave People" to several and they seemed to get quite a kick out of it, as well as profit.

I may be a little fussy, but this is my criticism, and I wish it to be taken as constructive: I have been wondering whether or not you could make the new DENTAL DIGEST more nearly the size of the old book and still display your illustrations satisfactorily. The magazine now handles too much like the *Ladies' Home Journal.* If one desires to file the issues, one will find that they require an odd-sized space which does not correspond with the space required by other dental and medical journals.

I subscribe to the *Clinical Medicine and Surgery Journal.* Its measurements are 7½" x 10½" and I think this size might be handled better if you feel that the original magazine size should be enlarged for your purpose.

I wish you success in your new venture. — HARVEY IREDELL, D.D.S., *New Brunswick, N. J.*

I wish to express my appreciation of THE DENTAL DIGEST. I eagerly watch for each succeeding number.—E. A. SHEEHY, D.D.S., *Rumford, Me.*

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THE EVOLUTION OF THE TOOTHBRUSH

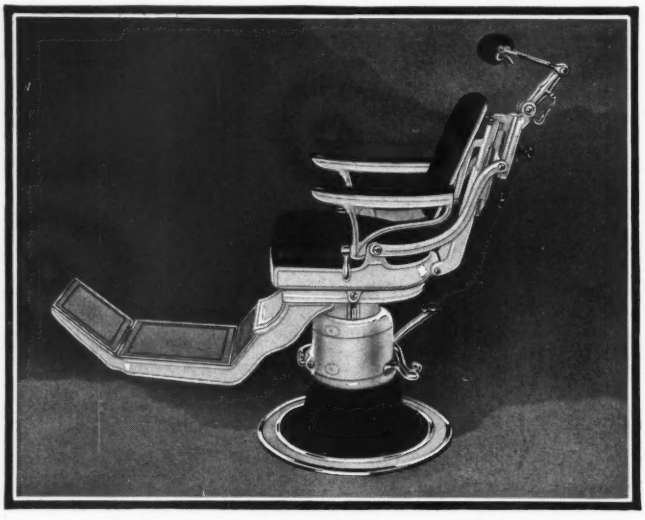
ACCORDING to some researches by Doctor W. F. Sudro, Dean of the College of Pharmacy of the North Dakota State College of Agriculture, no authoritative data are available to indicate the origin of the toothbrush, its make-up and its first uses. In Doctor Sudro's communication he says: We are informed by Doctor Asgis that the ancients used the "chew-stick," a twig about the size of a carpenter's pencil, with one end beaten to a soft fibrous condition. This not only cleaned the teeth, but also gave the gums a gentle massage. It was used with the same up-and-down motion as the present-day bristle toothbrush is used by some patients. The fibers of the "chew-stick" toothbrush were used in such a way that they penetrated the interproximal spaces, with the object of removing food particles lodged there. Once used the "chew-stick" brush was discarded and a new one made for the next occasion.

All pious Mohammedans were accustomed to use a "chew-stick" known as a *siwak*. Mohammed not only described the proper grasp for holding the *siwak* but also gave detailed directions for its use. The *siwak* is first to be applied to the buccal surfaces of the upper and the lower teeth, proceeding from right to left, and then from left to right. The lingual surfaces are cleaned in a similar manner. Thereupon the *siwak* is to be guided into all the interdental spaces, and finally the tongue is to be brushed lightly to remove the superficial deposit. These ablutions were always accompanied with appropriate prayers.

The ancient Indians of the east also used a "chew-stick" in somewhat similar manner, the time of cleaning occupying more than fifteen minutes daily. Westerners use a toothbrush which they hardly ever think of sterilizing, but the Indians were wiser and had a new brush each day.

About the earliest record we have of the hair-bristle toothbrush dates back about 125 years. The quality must have been poor for we read, "While you are waiting for a fresh supply of toothbrushes, battering your teeth with the ivory, and pricking your gums with the bristles of your old one, completely grubbed out in the middle—its few remaining hairs starting off horizontally on all sides . . ." Doubtless the description applied to the family toothbrush which has gone the way of the family album and the old gray mare.

Today, a brush to meet professional requirements should be shaped properly to fit the dental arches. This is a factor which often is neglected. The bristles should consist of the butt ends only and they should be of uniform diameter. Bristles cut from the tip ends are valueless for the desirable durability and stiffness in daily use, and uniformity of diameter gives more uniform flexibility to the brush as a whole. Only natural white bristles should be employed. Many brushes on the market have white bristles, but originally the bristles were dark-colored and in order to produce a white bristle a bleaching process was used. All animal fiber is weakened by bleaching and brushes made from such fibers will quickly lose their rigidity. The tufts should be properly pointed in order to clean thoroughly the interdental spaces, and the tufts should be widely spaced at the base in order to keep the brush clean. Finally, the tufts are to be drawn by hand into the handle with rust-proof wire, and the handle should be properly curved. Such a first-class modern toothbrush cannot be marketed at a price which will admit of dime-store merchandising.



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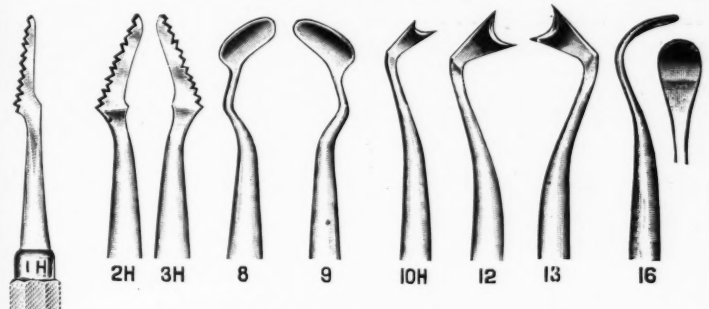

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Formula of Dr. P. W. Boutwell, Ph.D. and Dr. P. A. Howell, D.D.S.

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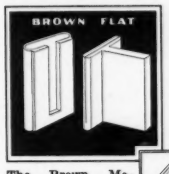
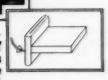
For Removable Bridgework

No. 1 The Closed Bottom





The Brown Medium Flat—one of nine different shapes and sizes. Note the "closed bottom" construction.

That's why a Brown-Sorensen Bridge is so easy to insert—when the attachment is spread, the bottom is unchanged. Therefore, it always is so easy to seat back into place.

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THE PUBLISHER'S NOTE BOOK

THE DENTAL DIGEST'S new staff members spend odd moments leafing through the bound volumes of the old DIGEST — thirty-seven of them. The first issue of the magazine appeared in January, 1895, as the official organ of the Dental Protective Association of the United States. Doctor J. N. Crouse headed this organization and as the DIGEST'S sponsor he soon made its presence felt.

The first article in the first issue was from his pen, "Suggestions on Developing and Conducting a Dental Practice on Business Principles" —one of the very early expressions on this topic.

The first editor was Doctor Allison W. Harlan. Then D. Howard Crouse — Doctor Crouse's son — became editor. He conducted the magazine until his death in January, 1906.

He was succeeded by Doctor J. P. Buckley, who proved a brilliant editor, the journal continuing to progress under his administration.

Doctor Buckley retired when THE DIGEST, in January, 1909, became the property of The Dentists' Supply Company. Then, as everybody knows, Doctor George Wood Clapp became editor. He directed the destinies of the magazine for twenty-three years until it was sold a little while ago to Oral Hygiene Publications, by whom Doctor Edward J. Ryan was appointed editor-in-chief.

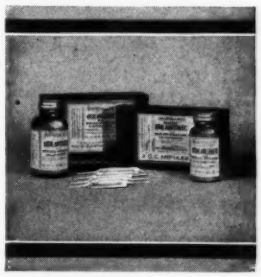
Doctor Clapp's long administration—nearly a quarter-century—was marked by many worth while accomplishments; he likely would be astonished if he knew how many pages in these twenty-three fat volumes were written by his own gifted pen.

In his opening editorial in the January, 1909, issue, Doctor Clapp forecast the famous "Brother Bill" letters, which later were republished in book form:

"A certain dentist who fears not to say what he thinks, recently wrote some letters relating things he saw and heard away from home. We have secured a few of these letters and hope to get more. As no names can appear, the writer has been christened 'Brother Bill'."

From time to time we'll dip into these dusty DIGESTS and reprint interesting bits here in The Note Book.

MERWIN B. MASSOL, *Publisher*



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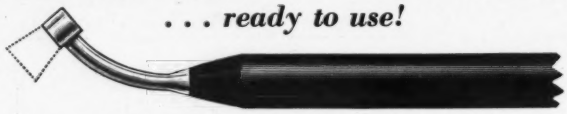

It's not necessary to make your own medicament applicator to carry out the idea suggested by Dr. C. P. Cleveland on page 89 of THE DENTAL DIGEST last month.

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CASTING SUGGESTIONS

GRAVES PEAY, D.D.S.
Little Rock, Arkansas

INLAY TECHNIQUE — Casting to the Model.

A. *Wax Manipulation*

1. "Wet heat" rather than "dry heat" should be used to soften the wax. The wax is warmed and adapted with dry heat, and placed in the matrix band; the band with wax is dropped into hot water (sterilizer at low heat). The wax is softened uniformly through the entire mass. (It just "hangs" together. The molecular structure is intact.)

2. The matrix band is carried (not pushed) to place, then chilled with ordinary tap water, removed, checked, replaced, chilled again.

This pattern will not need to be expanded.

B. *Investment*

1. Investment is sifted into the water as the plaster bowl is rotated, and mixed to about the consistency of milk.

OBJECT: To secure a "bubble-free" mix.

2. The mix is poured on a piece of blotting paper. This absorbs the excess moisture, leaving a body of investment which rapidly thickens.

OBJECT: To secure a thick, quick-setting, smooth mix with a minimum of moisture.

3. The mixture is vibrated to place in the wax impression.

4. Further steps as with usual "casting to the model" technique.

DENTIFRICES

It is interesting to note that about 400 B. C. Hippocrates advised that black unhealthy gums should be treated with a mixture of dill, anise seed and myrrh dissolved in pure white wine. This mouth wash may be regarded as the progenitor of the familiar tincture of myrrh and borax. Hippocrates advised that the mouth should be rinsed with this lotion after each meal and also when fasting. The use of chalk, even today the main ingredient of most tooth preparations, was known to Hippocrates who recommended that it should be used mixed with the "head of a hare" and the "intestines of a mouse." The favorite tooth paste of Messalina, the notoriously immoral wife of the Emperor Claudius, was composed of calcined Stag's horn, mastic and sal ammoniac.